55-1520-238-23-3

TM 55-1520-238-23-3

DESCRIPTION AND OPERATION – POWER PLANTS

MAINTENANCE – ENGINES

MAINTENANCE – COOLING SYSTEM

MAINTENANCE – AIR INDUCTION

MAINTENANCE – EXHAUST SYSTEM

MAINTENANCE – OIL SYSTEM

MAINTENANCE – POWER CONTROLS

DESCRIPTION AND OPERATION – ROTOR SYSTEM

MAINTENANCE – MAIN ROTOR

MAINTENANCE – TAIL ROTOR

TECHNICAL MANUAL

AVIATION UNIT AND INTERMEDIATE MAINTENANCE MANUAL

FOR

ARMY
AH-64A HELICOPTER

CHAPTER 4
POWER PLANTS

CHAPTER 5
ROTORS

"Approved for public release; distribution is unlimited."

This manual together with TM 55-1520-238-23-1, 7 June 1988, TM 55-1520-238-23-2, 7 June 1988, TM 55-1520-238-23-4, 7 June 1988, TM 55-1520-238-23-5, 7 June 1988, TM 55-1520-238-23-6, 7 June 1988, TM 55-1520-238-23-7, 7 June 1988, TM 55-1520-238-23-8, 7 June 1988, TM 55-1520-238-23-9, 7 June 1988, TM 55-1520-238-23-10, 7 June 1988, supersedes TM 55-1520-238-23-1, 4 March 1985, TM 55-1520-238-23-2, 4 March 1985, TM 55-1520-238-23-3, 4 March 1985, TM 55-1520-238-23-4, 4 March 1985, TM 55-1520-238-23-5, 4 March 1985, TM 55-1520-238-23-6, 4 March 1985, TM 55-1520-238-23-7, 4 March 1985, TM 55-1520-238-23-8, 4 March 1985.

HEADQUARTERS, DEPARTMENT OF THE ARMY

7 JUNE 1988

CHAPTER 4

POWER PLANT

CHAPTER OVERVIEW

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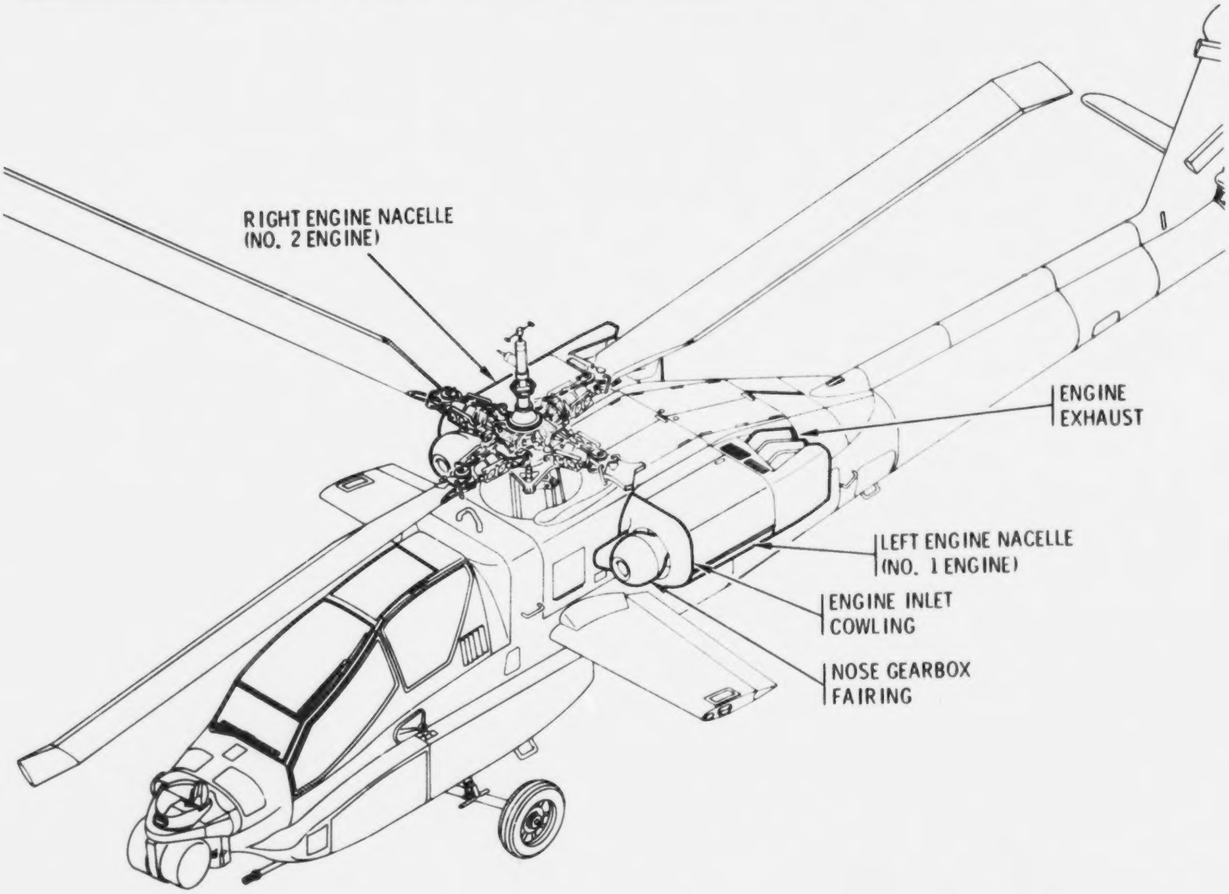
Section I. POWER PLANT

DESCRIPTION AND OPERATION

4-1-1. POWER PLANT DESCRIPTION AND OPERATION 4-1-1


RIGHT ENGINE NACELLE
(NO. 2 ENGINE)
ENGINE
EXHAUST
LEFT ENGINE NACELLE
(NO. 1 ENGINE)
ENGINE INLET
COWLING
NOSE GEARBOX
FAIRING

MM04-1895

4-1-1. POWER PLANT DESCRIPTION AND OPERATION (cont)

A. The power plant consists of the left and right engines related systems. Left is No. 1 engine, and right is No. 2 engine.

B. The related systems control the engines and provide for cooling and engine exhaust. The systems include:

Engine Cooling

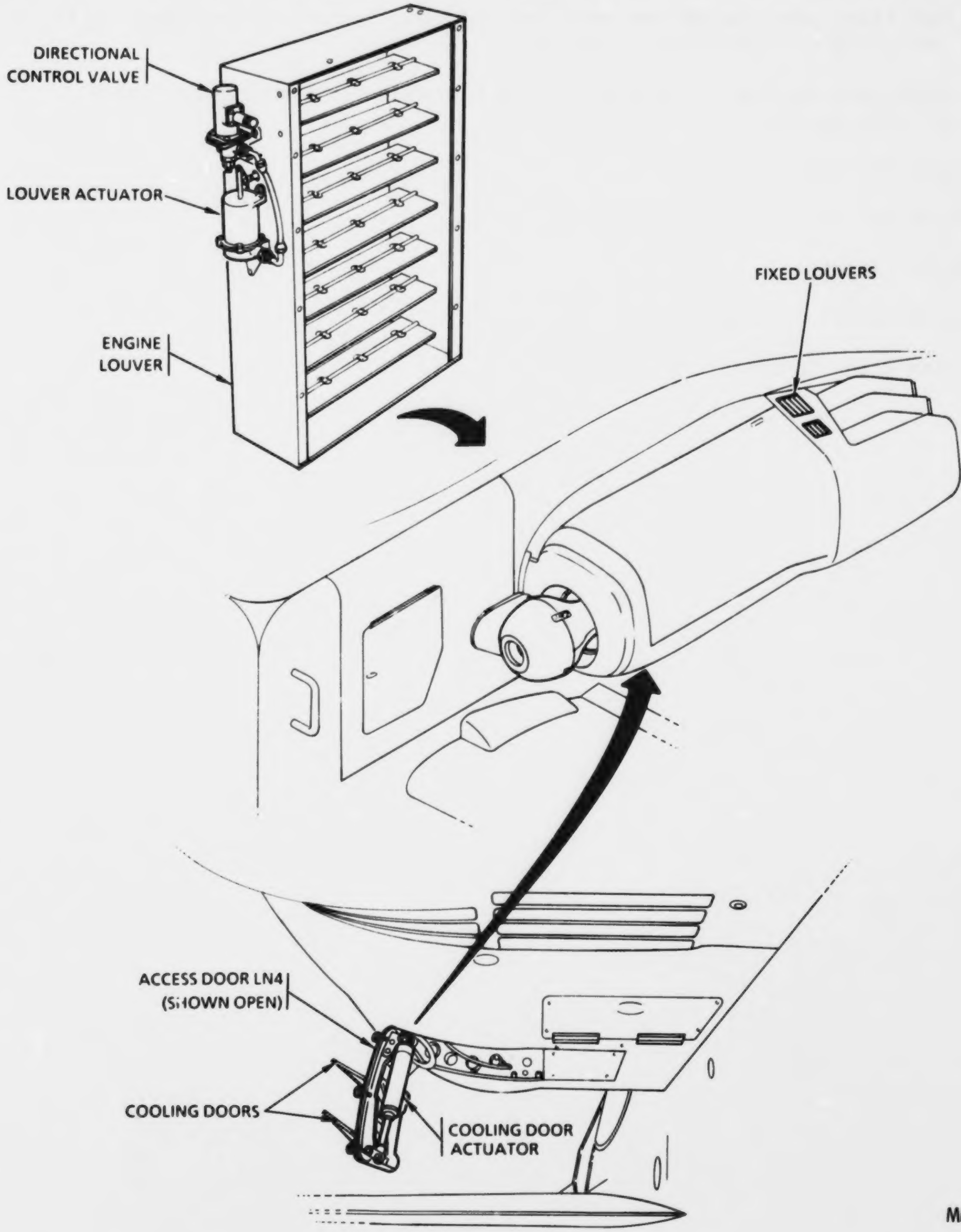
Engine Anti-ice

Engine Exhaust

Engine Ignition (Starting)

Engine Power Controls and Indicators

4-1-2. ENGINE COOLING SYSTEM DESCRIPTION AND OPERATION 4-1-2


DIRECTIONAL CONTROL VALVE
LOUVER ACTUATOR
ENGINE LOUVER
FIXED LOUVERS
ACCESS DOOR LN4 (SHOWN OPEN)
COOLING DOORS
COOLING DOOR ACTUATOR

MM04-1872C

4-1-2. ENGINE COOLING SYSTEM DESCRIPTION AND OPERATION (cont)

A. The cooling system provides cooling air for the engines. It helps to vent exhaust gases during engine operation, and aids in cooling after engine shutdown.

B. The major components of the cooling system for each engine are:

Louver

Louver actuator

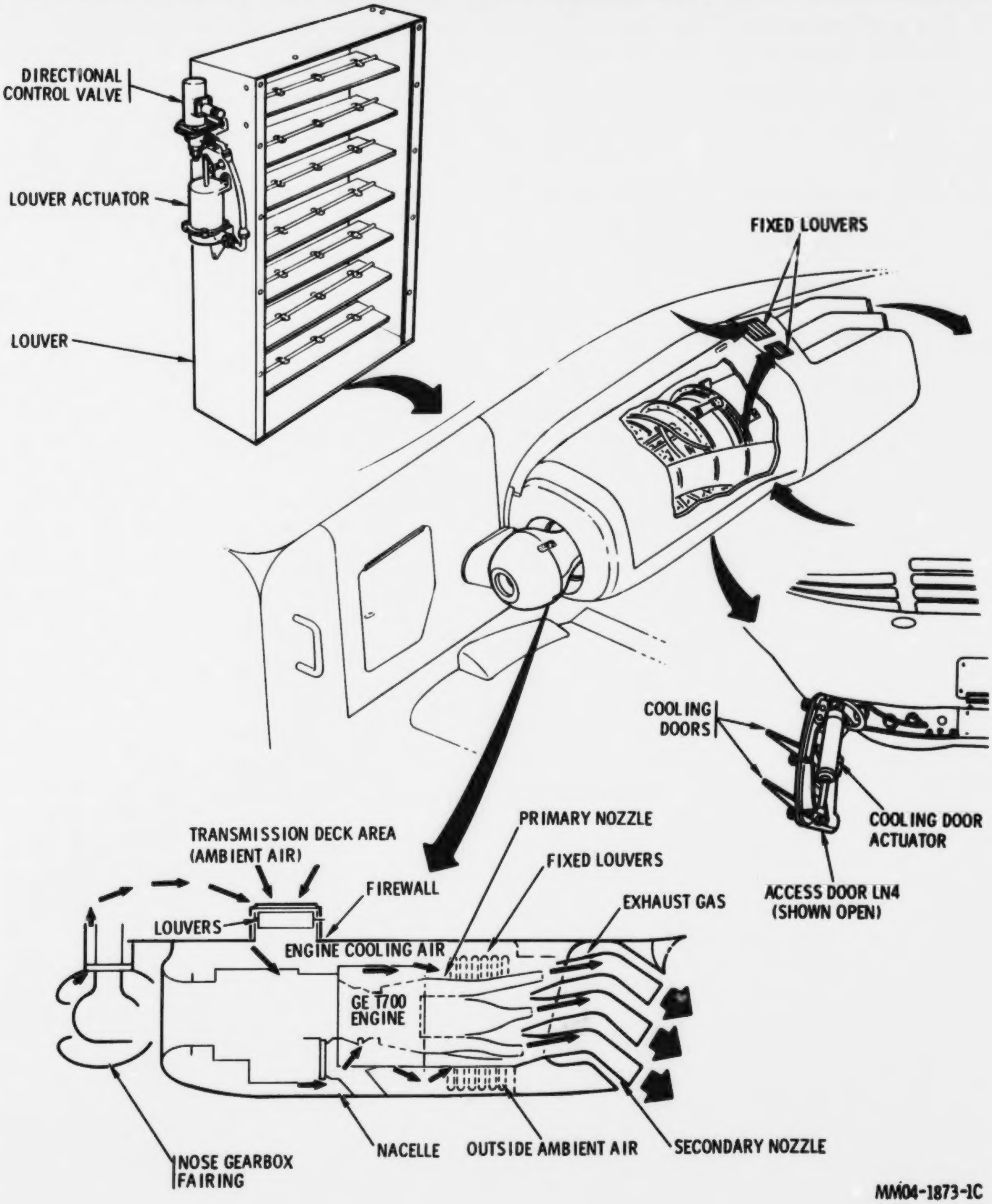
Directional control valve

Cooling doors

Cooling door actuator

Fixed louvers

4-1-2. ENGINE COOLING SYSTEM DESCRIPTION AND OPERATION (cont) 4-1-2


DIRECTIONAL CONTROL VALVE
LOUVER ACTUATOR
LOUVER
FIXED LOUVERS
COOLING DOORS
COOLING DOOR ACTUATOR
ACCESS DOOR LN4 (SHOWN OPEN)
TRANSMISSION DECK AREA (AMBIENT AIR)
LOUVERS
FIREWALL
PRIMARY NOZZLE
FIXED LOUVERS
EXHAUST GAS
ENGINE COOLING AIR
GE T700 ENGINE
NOSE GEARBOX FAIRING
NACELLE
OUTSIDE AMBIENT AIR
SECONDARY NOZZLE

MM04-1873-1C

4-1-2. ENGINE COOLING SYSTEM DESCRIPTION AND OPERATION (cont)

C. The cooling system provides a flow of air to cool the engines during engine operation.

D. Cooling air enters each engine nacelle through fixed louvers at the top and bottom of the nacelle. It also enters through the louvers between the nacelle and the main transmission deck.

E. The air circulates around the engine. It then enters the secondary nozzle of the exhaust system.

F. Exhaust gas flowing from the primary to secondary exhaust nozzle pulls cooling air into the nacelle.

G. The louver vanes are normally open. If a fire occurs during engine operation, the pilot or CPG fire control handle is pulled and louver vanes will close.

H. Closing the vanes keeps air from entering the nacelle. This also keeps the firefighting agent from entering the transmission deck.

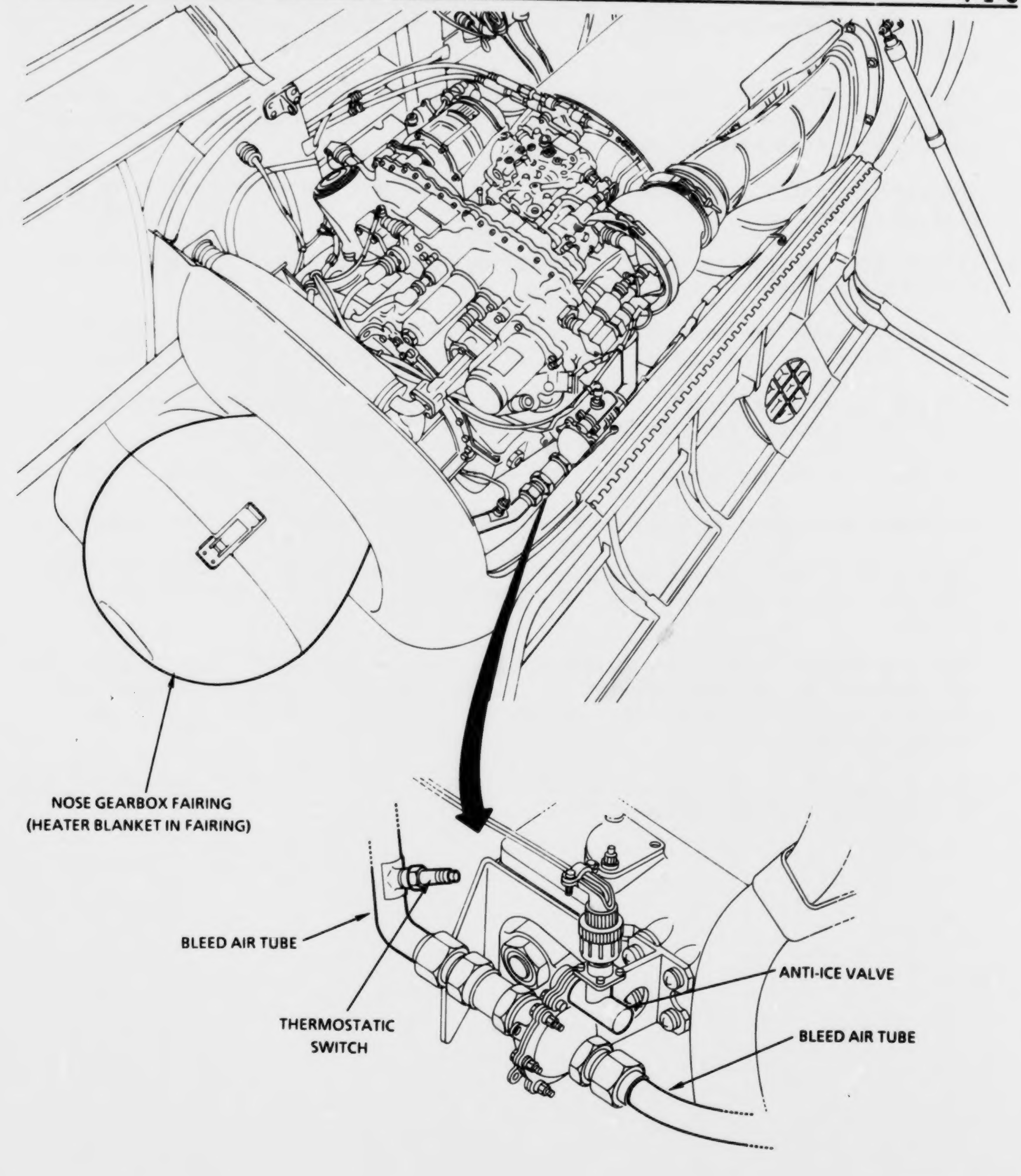
I. The louver vanes are actuated by air from the pressurized air system.

J. The vanes are closed by the louver actuator. The actuator is spring-loaded open.

K. The piston of the actuator extends to move the louver vanes to closed position. The vanes will remain closed as long as pressurized air is applied to the actuator.

L. When the engine is operating, bleed air is directed to the cooling door actuator. Air pressure against the actuator piston overcomes the spring and extends the piston rod to close the doors. The doors will remain closed as long as the engine is operating.

M. When the engine is not operating, cooling doors on the bottom of the nacelle are held open by a spring-loaded actuator.


NOSE GEARBOX FAIRING
(HEATER BLANKET IN FAIRING)
BLEED AIR TUBE
THERMOSTATIC SWITCH
ANTI-ICE VALVE
BLEED AIR TUBE

MM04-1874A

4-1-3. ENGINE ANTI-ICE SYSTEM DESCRIPTION AND OPERATION (cont) 4-1-3

A. The engine anti-ice system prevents icing of the engine air inlets and the nose gearboxes.

B. The major components of the anti-ice system for each engine are:

Thermostatic switch

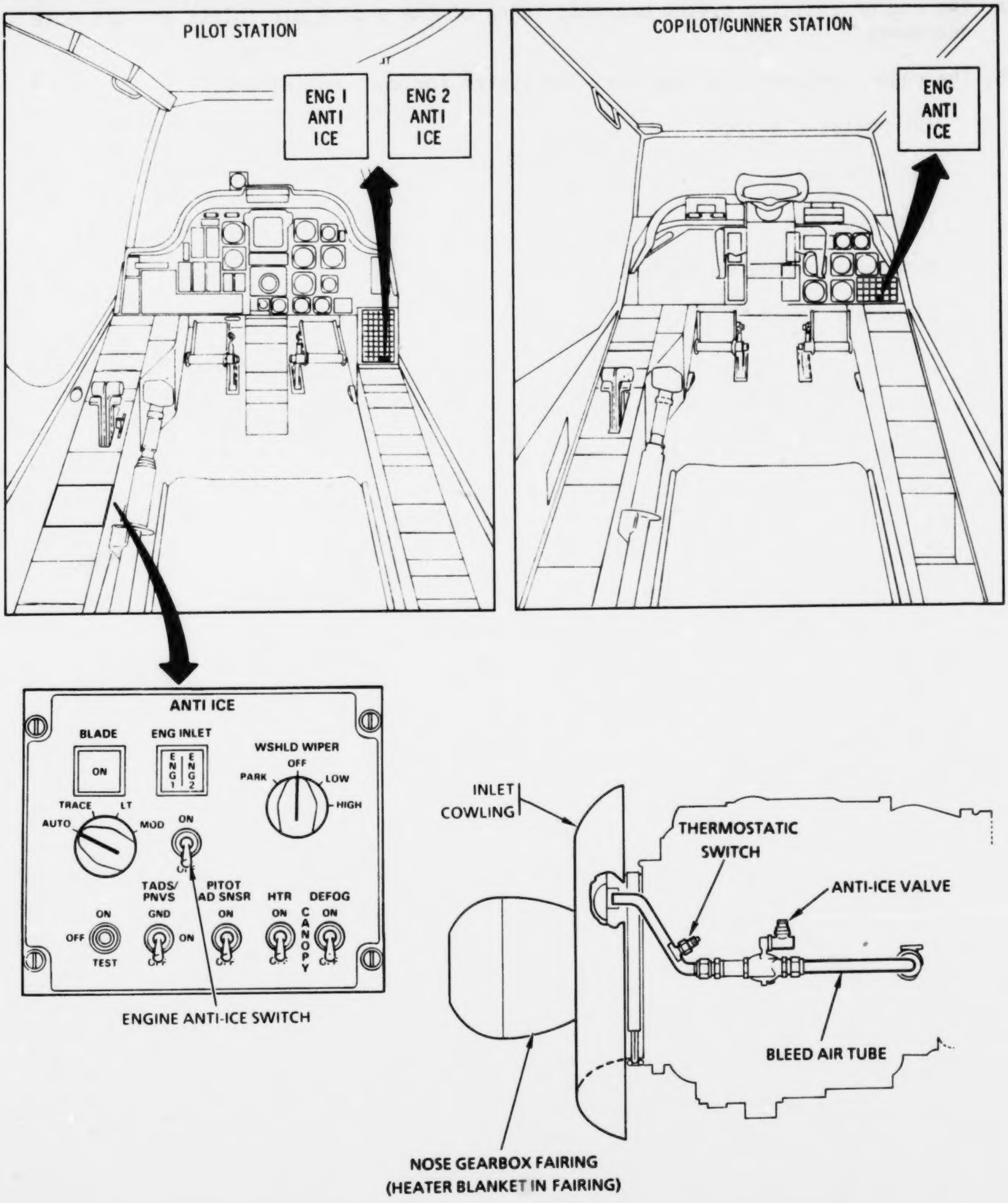
Anti-ice valve

Inlet cowling

Nose gearbox heater blanket

Bleed air tubes

4-1-3. ENGINE ANTI-ICE SYSTEM DESCRIPTION AND OPERATION (cont) 4-1-3


PILOT STATION
ENG I ANTI ICE
ENG 2 ANTI ICE
COPILOT/GUNNER STATION
ENG ANTI ICE
ANTI ICE
BLADE
ON
ENG INLET
ENG 1
ENG 2
WSHLD WIPER
OFF
PARK
LOW
HIGH
TRACE
LT
AUTO
MOD
ON
OFF
TADS/ PNVS
PITOT AD SNSR
HTR
DEFOG
ON
OFF
TEST
GND
CANOPY
ENGINE ANTI-ICE SWITCH
INLET COWLING
THERMOSTATIC SWITCH
ANTI-ICE VALVE
BLEED AIR TUBE
NOSE GEARBOX FAIRING (HEATER BLANKET IN FAIRING)

MM04-1875B

4-1-3. ENGINE ANTI-ICE SYSTEM DESCRIPTION AND OPERATION (cont)

C. The anti-ice system provides bleed air from the engines to the inlet cowling. This prevents the formation of ice in and around the cowling.

D. Heater blankets in the nose gearbox fairing prevent formation of ice on the gearbox coupling fan, and air duct to the main transmission deck.

E. Each engine has an anti-ice valve. It is spring-loaded open. The valve is closed by a solenoid.

F. The valves are controlled by the **ON/OFF** switch on the pilot **ANTI-ICE** panel.

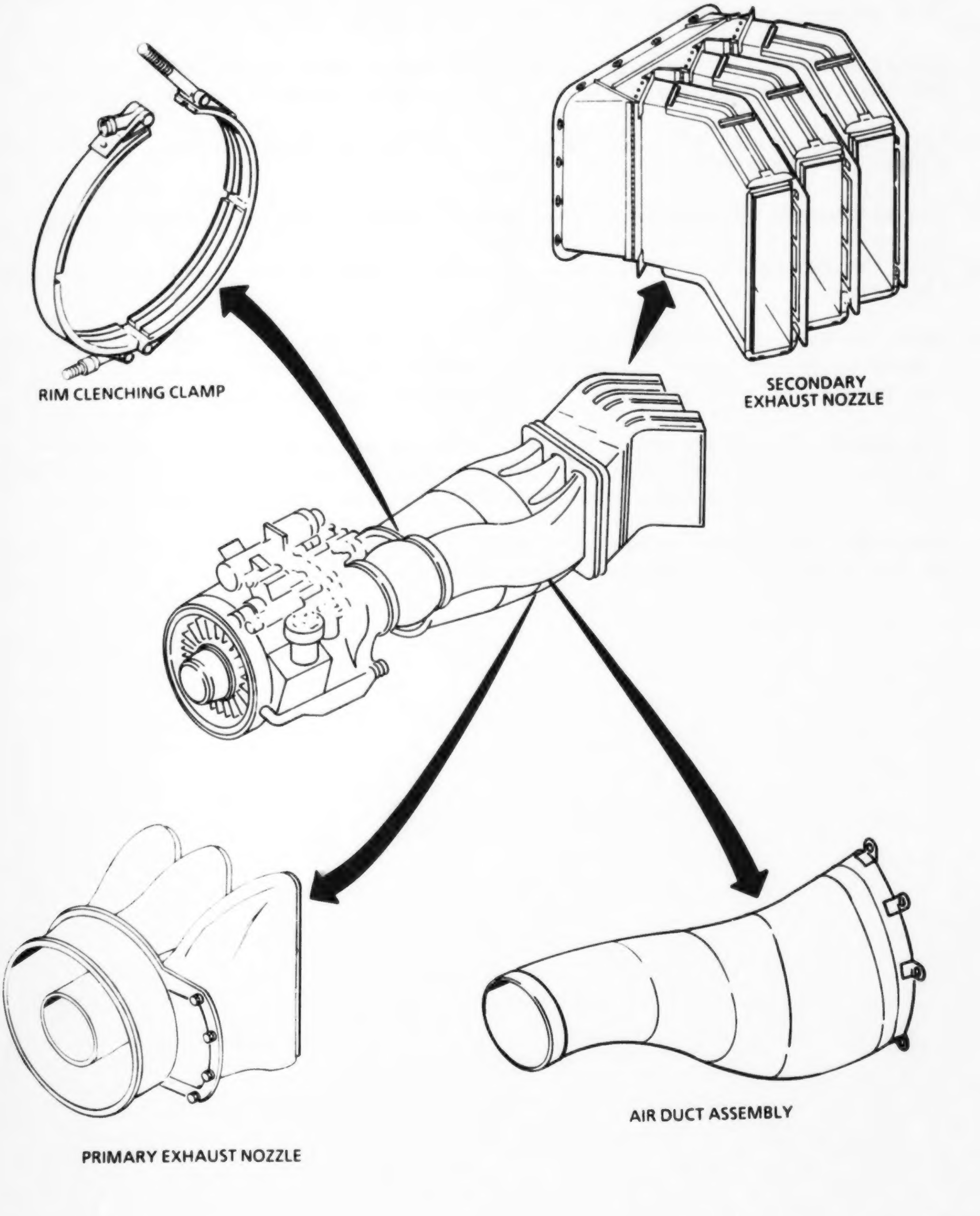
G. When the switch is in **OFF**, anti-ice valve solenoids are energized. This closes the valves.

H. When the switch is in ON, the solenoids are deenergized. This allows the spring-loaded valves to open. Bleed air is then ported to the engine inlet cowling. The switch also energizes heater blankets at the nose gearboxes.

I. Thermostatic switches at each engine cowling and nose gearbox are connected in series. When the temperature is high enough to prevent ice, either switch will close. This lights **ENG 1** or lights **ENG 2** on the pilot **ANTI-ICE** panel.

J. When the temperature is not high enough to prevent icing, the **ENG ANTI-ICE** lights on the pilot and CPG caution panels will come on.

4-1-4. ENGINE EXHAUST SYSTEM DESCRIPTION AND OPERATION 4-1-4


RIM CLENCHING CLAMP
SECONDARY EXHAUST NOZZLE
AIR DUCT ASSEMBLY
PRIMARY EXHAUST NOZZLE

MM04-1876B

4-1-4. ENGINE EXHAUST SYSTEM DESCRIPTION AND OPERATION (cont)

A. The engine exhaust system directs and cools engine exhaust gases and removes foreign particles from the engine.

B. The major components of the exhaust system for each engine are:

Primary exhaust nozzle

Rim clenching clamp

Secondary exhaust nozzle

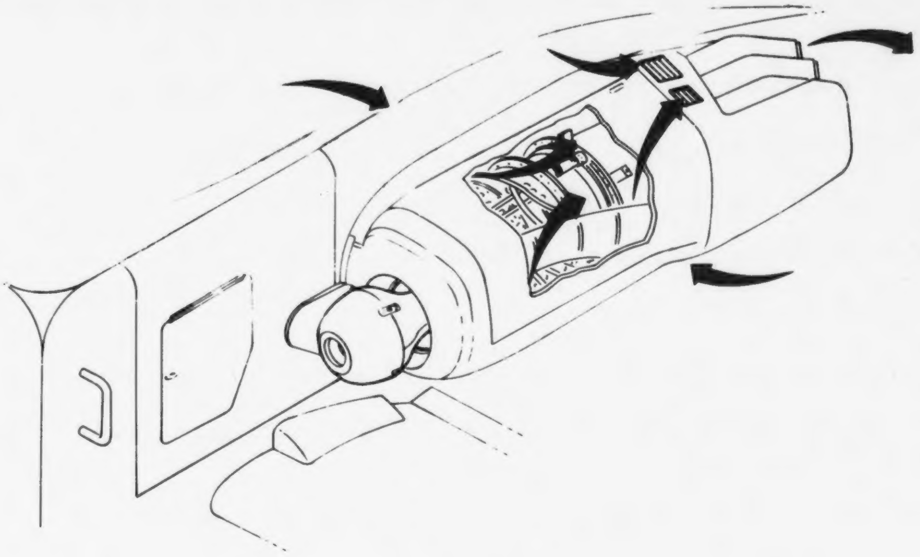
Air duct assembly

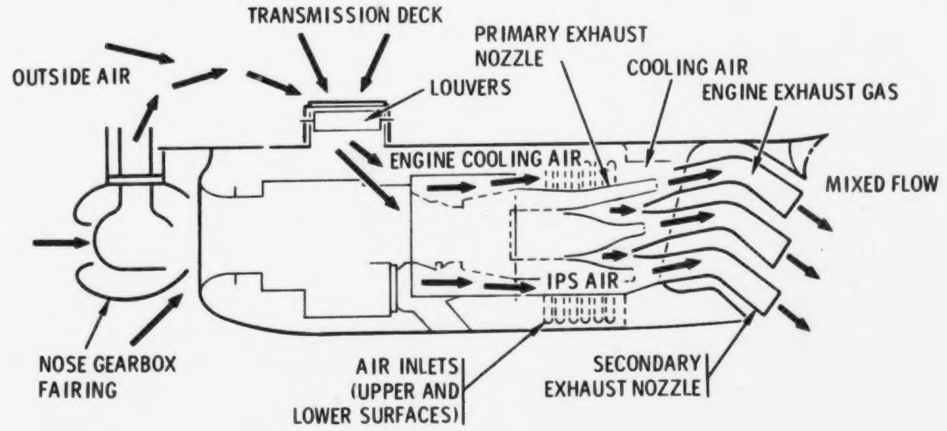
C. The primary exhaust nozzle is attached to the engine by the rim clenching clamp.

D. The secondary exhaust nozzle has three curved finned nozzles and is attached to the nacelle structure.

E. The air duct is attached to an adapter on the primary nozzle.

4-1-4. ENGINE EXHAUST SYSTEM DESCRIPTION AND OPERATION (cont) 4-1-4




TRANSMISSION DECK
OUTSIDE AIR
PRIMARY EXHAUST NOZZLE
LOUVERS
COOLING AIR
ENGINE EXHAUST GAS
ENGINE COOLING AIR
MIXED FLOW
IPS AIR
NOSE GEARBOX FAIRING
AIR INLETS (UPPER AND LOWER SURFACES)
SECONDARY EXHAUST NOZZLE

NACELLE TOP VIEW

MM04-1877

4-1-4. ENGINE EXHAUST SYSTEM DESCRIPTION AND OPERATION (cont) 4-1-4

F. During engine operation, exhaust gas from the engine is forced through the primary nozzle into the secondary nozzle.

G. The flow of exhaust gas from the primary to the secondary nozzle draws ambient (outside) air into the nacelle.

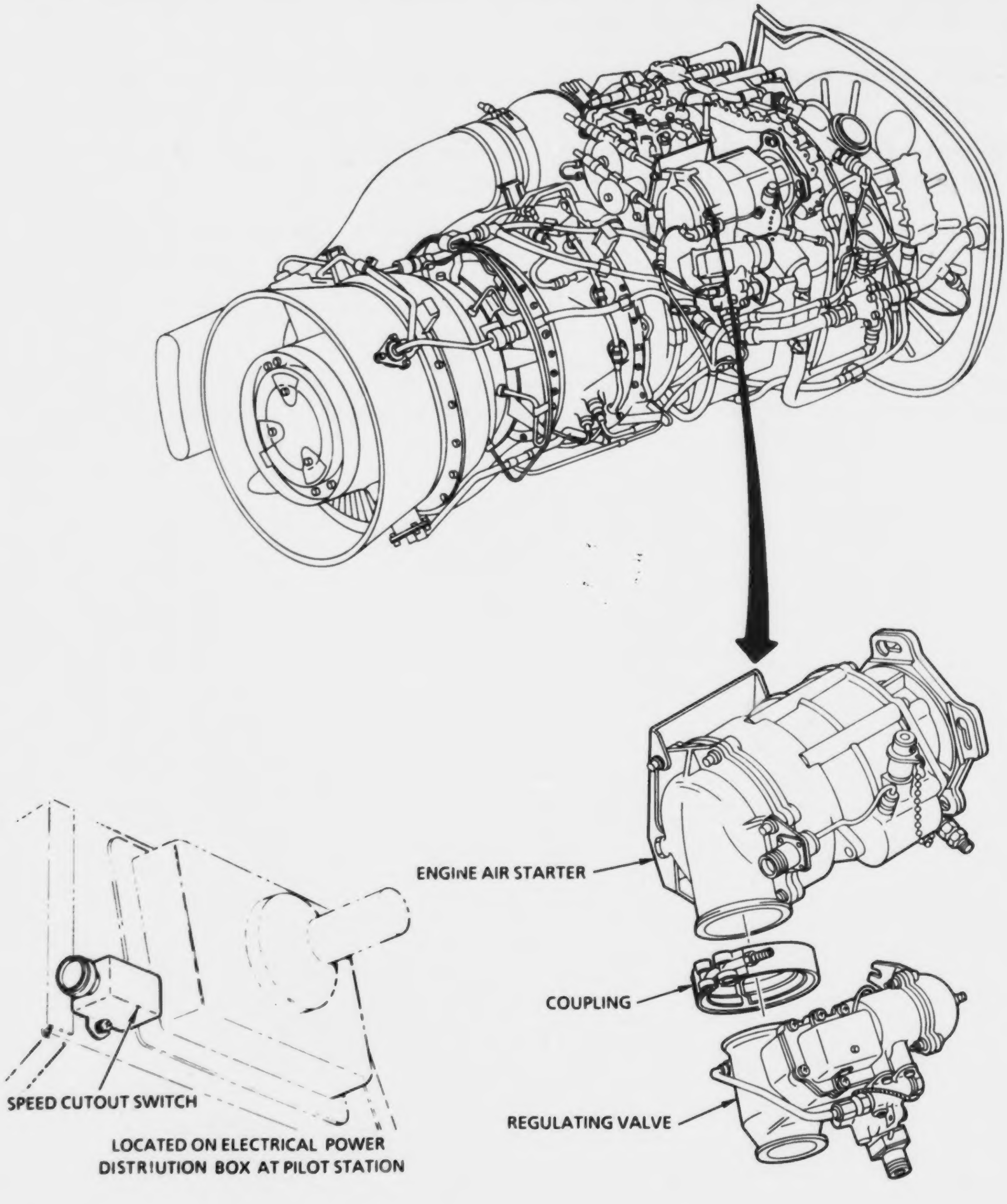
H. The ambient air in the nacelle is drawn into the secondary nozzle. The air mixes with the exhaust gas as it leaves the primary nozzle.

I. The ambient air mixing with the exhaust gas reduces the temperature of the exhaust gas. The remaining heat is absorbed by the secondary exhaust nozzle.

J. The fins on the secondary exhaust nozzle let off the remaining heat. This lowers the temperature of the exhaust gas leaving the nozzle.

K. The air duct receives air and foreign particles (if any) from the IPS blower. The duct routes them to the primary nozzle where it mixes with the exhaust gas.

4-1-5. ENGINE IGNITION (STARTING) SYSTEM DESCRIPTION AND OPERATION 4-1-5


ENGINE AIR STARTER
COUPLING
REGULATING VALVE
SPEED CUTOUT SWITCH
LOCATED ON ELECTRICAL POWER DISTRIUTION BOX AT PILOT STATION

MM04-1878B

4-1-5. ENGINE IGNITION (STARTING) SYSTEM DESCRIPTION AND OPERATION (cont) 4-1-5

A. For description and operation of the ignition system, refer to TM 55-4840-248-23.

B. The starting system uses air from the pressurized air system, and provides means for starting each engine.

C. Major components of the starting system for each engine are:

Starter speed control switch (starter cutoff switch)

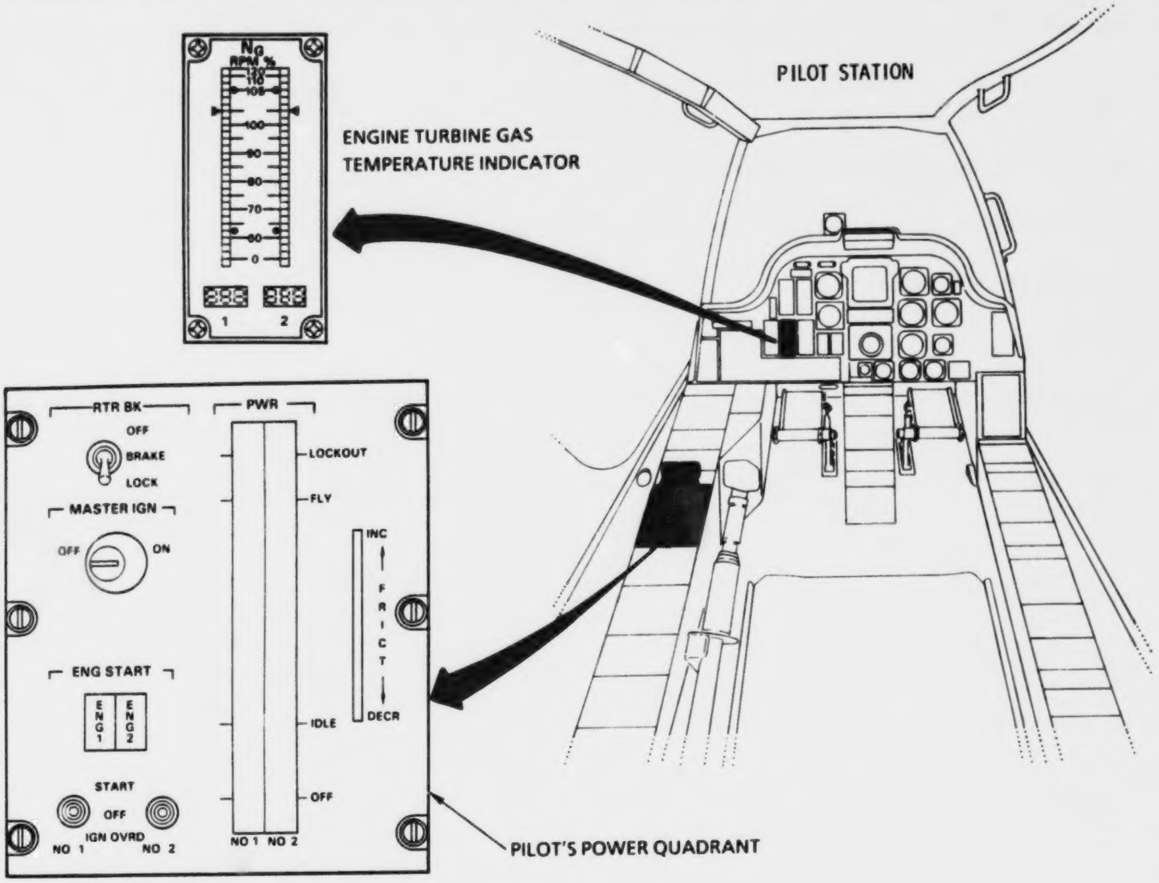
Regulating valve

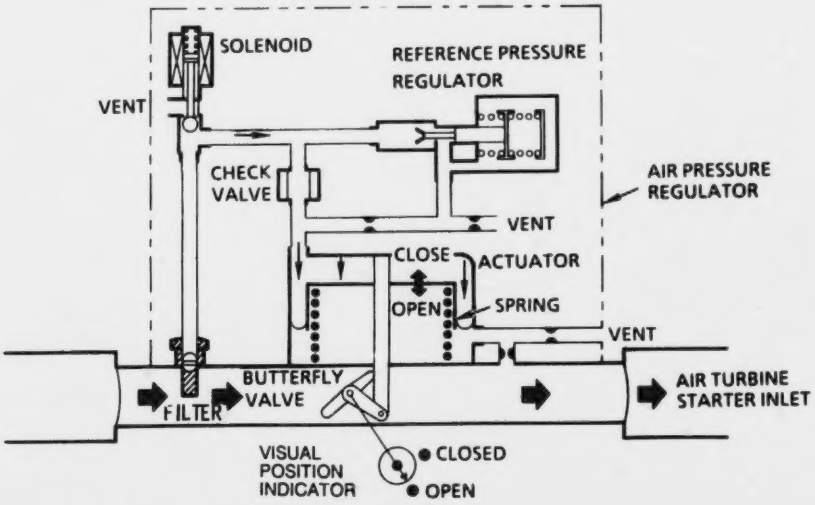
Engine air starter

D. The speed cutout switch is installed on the power center at the aft section of the pilot station.

E. The regulating valve is coupled to the engine air starter which is mounted on engine.

4-1-5. ENGINE IGNITION (STARTING) SYSTEM DESCRIPTION AND OPERATION (cont) 4-1-5


PILOT STATION
ENGINE TURBINE GAS
TEMPERATURE INDICATOR
NG
RPM %
120
110
105
100
90
80
70
60
0
1
2
RTR BK
OFF
BRAKE
LOCK
MASTER IGN
OFF
ON
ENG START
ENG 1
ENG 2
START
OFF
IGN OVRD
NO 1
NO 2
PWR
LOCKOUT
FLY
IDLE
OFF
NO 1 NO 2
INC
FRICT
DECR
PILOT'S POWER QUADRANT


SOLENOID
REFERENCE PRESSURE
REGULATOR
VENT
CHECK
VALVE
AIR PRESSURE
REGULATOR
VENT
CLOSE
ACTUATOR
OPEN
SPRING
VENT
BUTTERFLY
VALVE
FILTER
AIR TURBINE
STARTER INLET
VISUAL
POSITION
INDICATOR
CLOSED
OPEN

MM04-1879B

4-1-5. ENGINE IGNITION (STARTING) SYSTEM DESCRIPTION AND OPERATION (cont) 4-1-5

F. The regulating valve is an air-actuated, solenoid-controlled valve. The valve is spring-loaded in the closed position. An air filter is installed at the air inlet port.

G. The engine air starter consists of a turbine wheel, reduction gears, clutch, and output shaft.

H. The starter will disengage from the engine when engine speed exceeds the starter speed.

I. Oil to lubricate the starter is supplied from the oil sump in the starter case.

J. The speed cutout switch is a sealed electronic unit.

K. All engine starting controls are controlled and located by the pilot power quadrant.

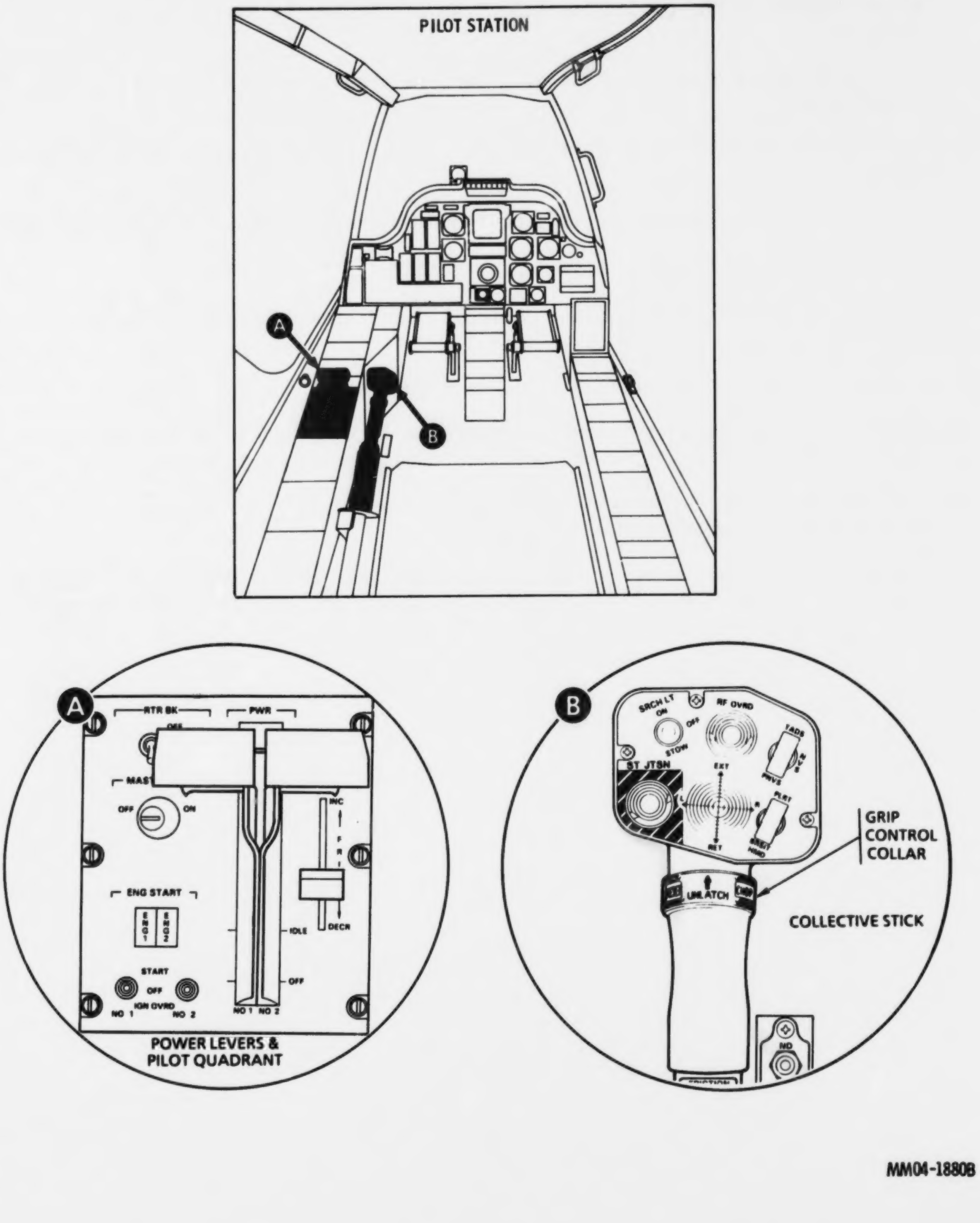
L. Engine turbine gas temperature (TGT) is displayed by the TGT indicator.

M. When the engine starting circuit is energized, the air vent on the regulator is closed. Pressurized air is then ported to the regulator actuator.

N. The actuator moves a butterfly valve to the open position. Pressurized air is then ported to the starter.

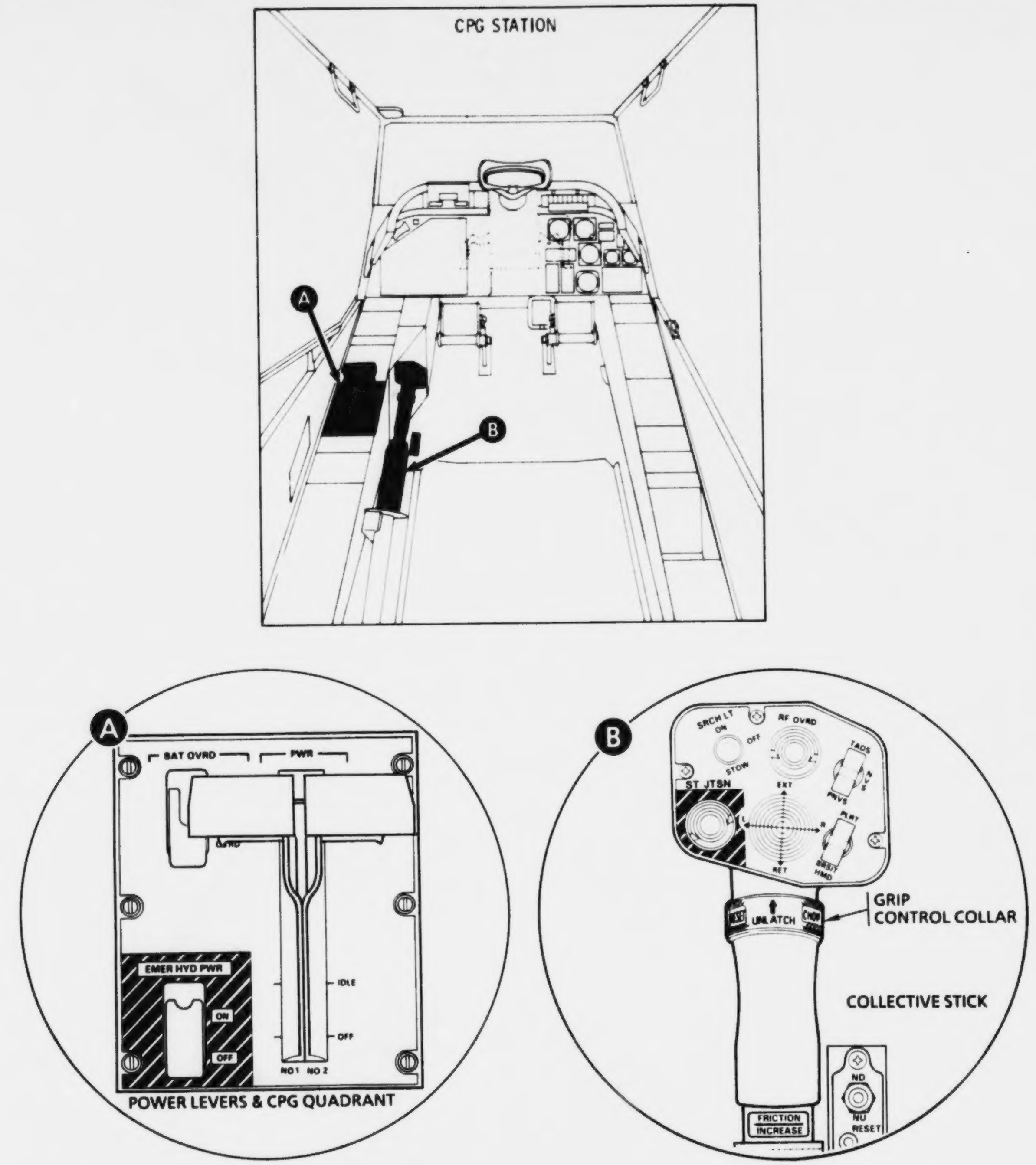
O. The position of the valve is shown on an indicator on the regulator. The ENG 1 or ENG 2 light on the pilot quadrant will also light when the valve is open.

4-1-6. ENGINE POWER CONTROLS AND INDICATORS DESCRIPTION AND OPERATION 4-1-6


PILOT STATION
A
B
RTR BK
PWR
MAST
OFF
ON
INC
F
R
I
DECR
IDLE
OFF
ENG START
ENG1
ENG2
START
OFF
IGN OVRD
NO 1
NO 2
NO 1
NO 2
POWER LEVERS &
PILOT QUADRANT
SRCH LT
ON
OFF
STOW
RF OVRD
TADS
PNVS
ST JTSN
EXT
RET
L
R
PLRT
UNLATCH
GRIP
CONTROL
COLLAR
COLLECTIVE STICK
ND

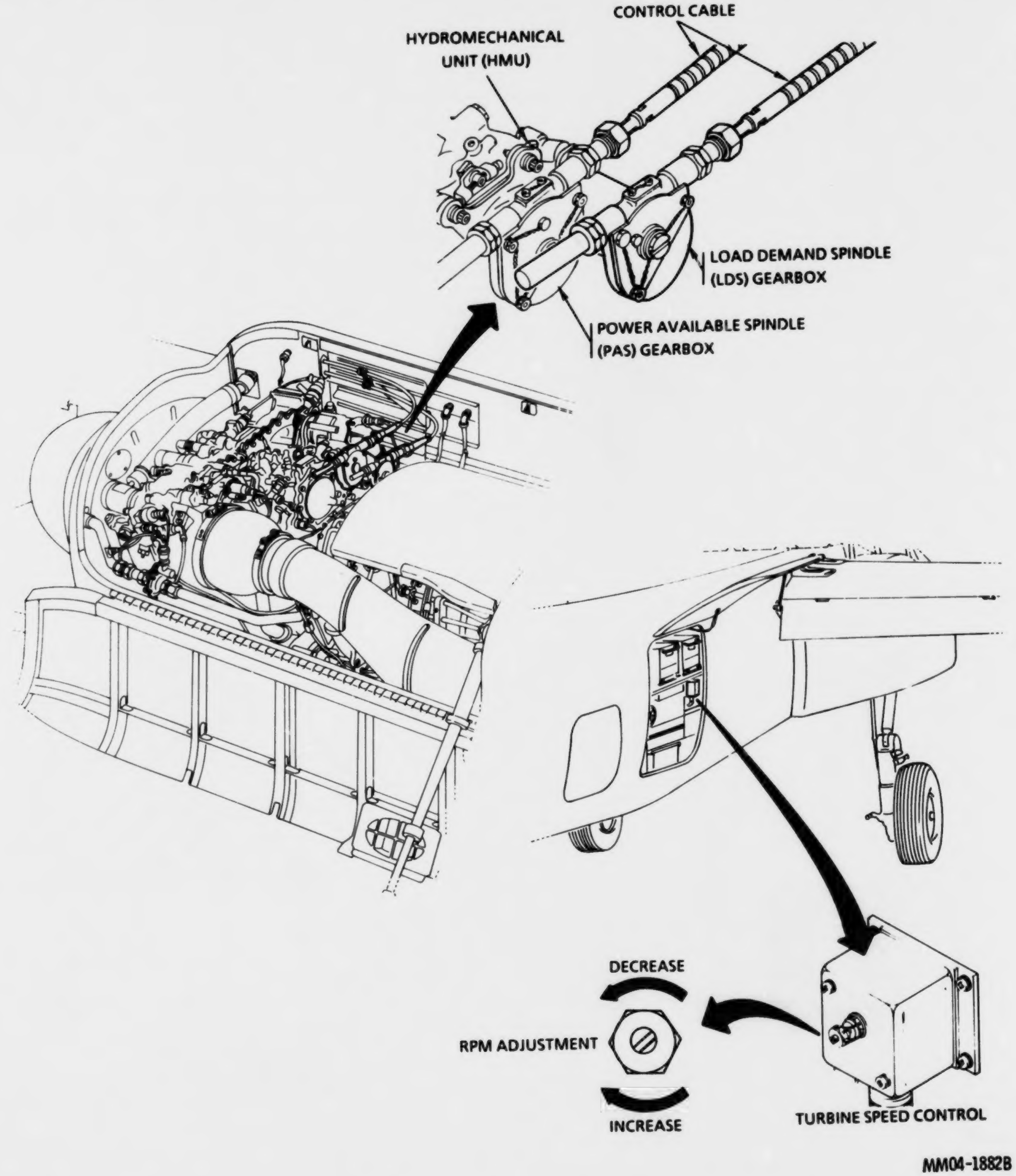
MM04-1880B

4-1-6. ENGINE POWER CONTROLS AND INDICATORS DESCRIPTION AND OPERATION (cont) 4-1-6


CPG STATION
A
B
BAT OVRD
PWR
OVRD
EMER HYD PWR
ON
OFF
IDLE
OFF
NO 1
NO 2
POWER LEVERS & CPG QUADRANT
SRCH LT
ON
OFF
STOW
RF OVRD
TADS
NVS
PNVS
ST JTSN
EXT
L
R
RET
PLRT
BRSIT
HMD
RESET
UNLATCH
CHOP
GRIP
CONTROL COLLAR
COLLECTIVE STICK
FRICTION
INCREASE
ND
NU
RESET

MM04-1881B

4-1-6. ENGINE POWER CONTROLS AND INDICATORS DESCRIPTION AND OPERATION (cont) 4-1-6


CONTROL CABLE
HYDROMECHANICAL UNIT (HMU)
LOAD DEMAND SPINDLE (LDS) GEARBOX
POWER AVAILABLE SPINDLE (PAS) GEARBOX
DECREASE
RPM ADJUSTMENT
INCREASE
TURBINE SPEED CONTROL

MM04-1882B

4-1-6. ENGINE POWER CONTROLS AND INDICATORS DESCRIPTION AND OPERATION (cont) 4-1-6

A. Engine power controls control the engine by providing command inputs to the hydromechanical unit (HMU) on each engine. The HMU controls the amount of fuel supplied to the engines.

C. Major components of the engine power control system are:

Pilot power quadrant

CPG power quadrant

Control cables

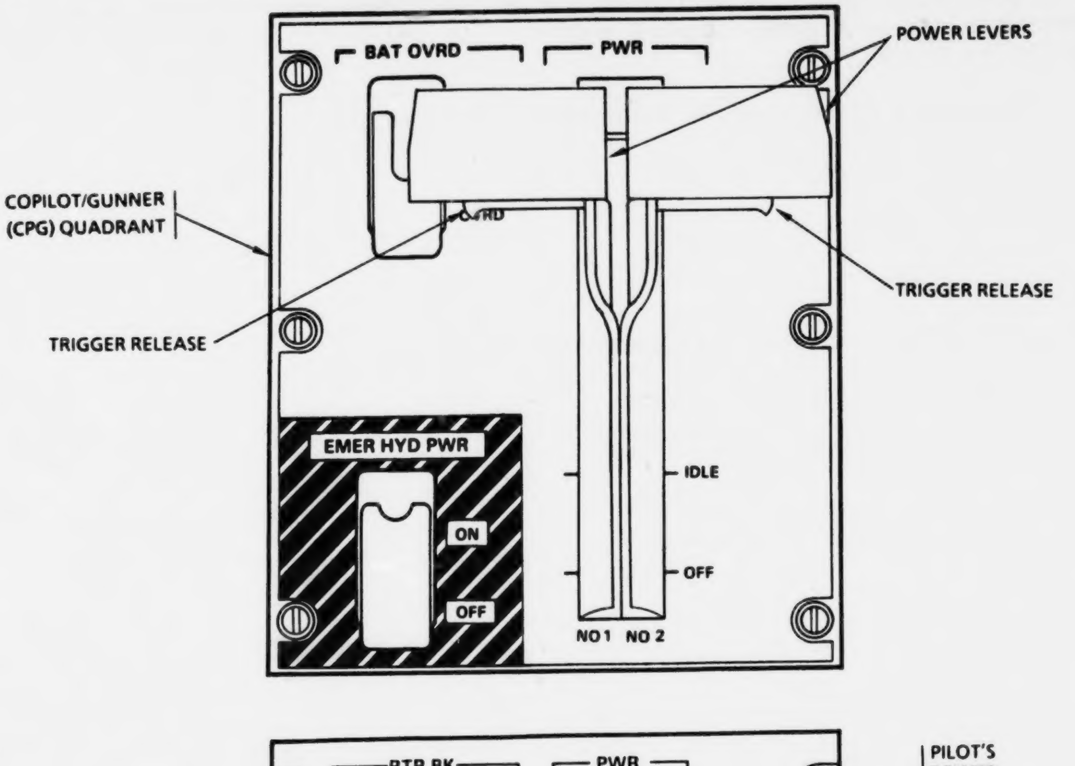
Power available spindle (PAS) gearbox

Load demand spindle (LDS) gearbox

Grip control collar switch

Turbine speed control

4-1-6. ENGINE POWER CONTROLS AND INDICATORS DESCRIPTION AND OPERATION (cont) 4-1-6


BAT OVRD
PWR
POWER LEVERS
COPILOT/GUNNER (CPG) QUADRANT
OVRD
TRIGGER RELEASE
TRIGGER RELEASE
EMER HYD PWR
ON
OFF
IDLE
OFF
NO 1
NO 2
RTR BK
PWR
OFF
PILOT'S POWER QUADRANT
POWER LEVERS
MAST
OFF
ON
INC
TRIGGER RELEASE
TRIGGER RELEASE
FRI
FRICTION POWER LEVER
DECR
ENG START
ENG 1
ENG 2
IDLE
START
OFF
IGN OVRD
NO 1
NO 2
OFF
NO 1
NO 2

MM04-1883-1B

4-1-6. ENGINE POWER CONTROLS AND INDICATORS DESCRIPTION AND OPERATION (cont) 4-1-6

D. The pilot and CPG power quadrants transmit power selections from the crew stations to the engines.

E. The engines are controlled by two power levers. The left lever operates No. 1 engine. The right lever operates the No. 2 engine.

F. The power levers have four positions: **OFF, IDLE, FLY, LOCKOUT.**

OFF - Fuel flow to the engines is stopped.

IDLE - Engines operate at ground idle speed.

FLY - Normal operation. Engines are automatically controlled by an electrical control unit.

LOCKOUT - Disconnects the automatic control. This allows manual control of the engines with the power levers.

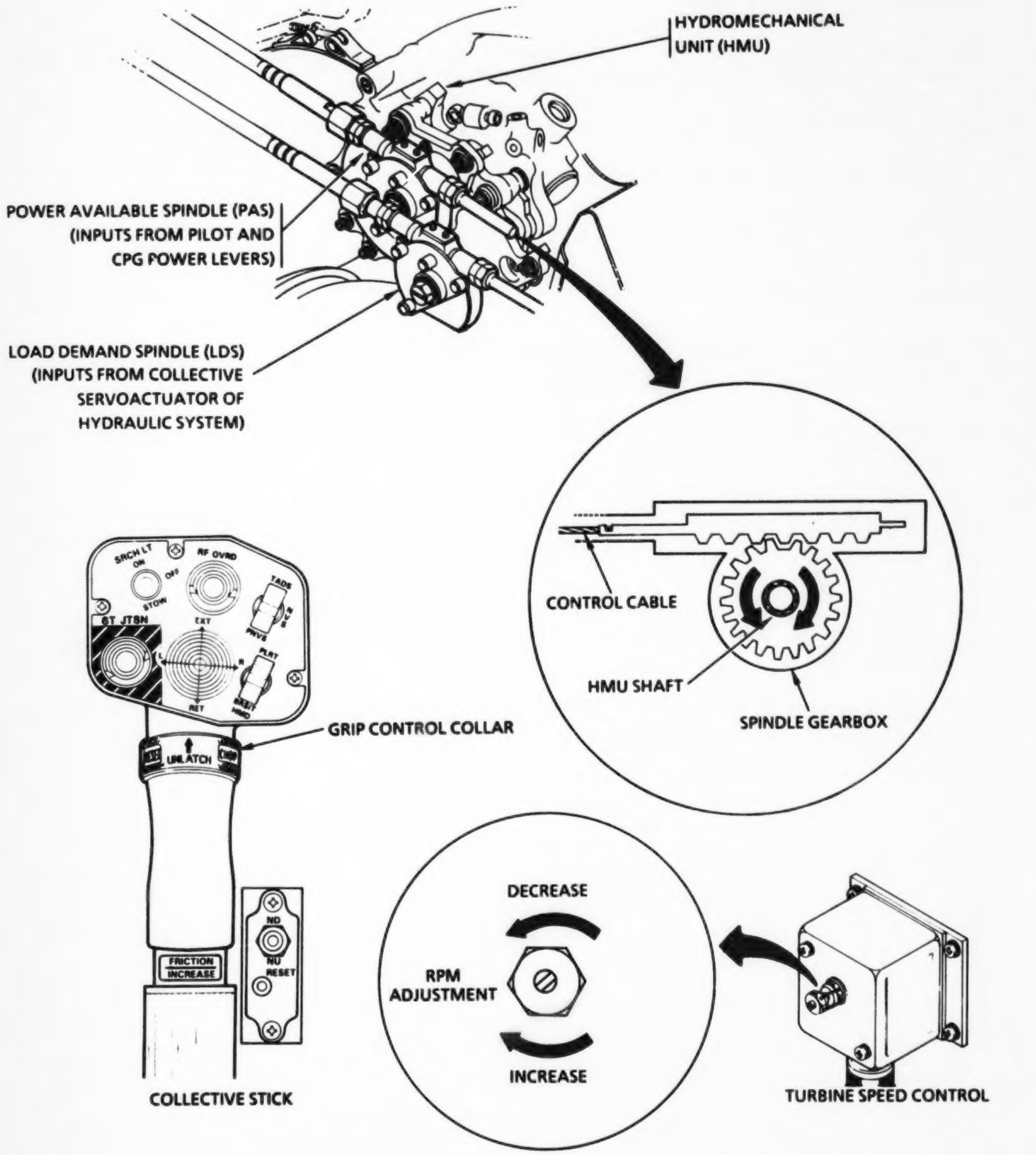
G. The power levers must be placed in **IDLE** to return to automatic control. They are then advanced to the **FLY** position.

H. The pilot quadrant has mechanical stops to prevent the pilot and CPG power levers from being moved from **FLY** to **LOCKOUT** or from **IDLE** to **OFF**. The stops are released by a trigger release on the power levers.

I. The CPG quadrant has no mechanical stops. The stop release levers on the CPG power levers operate a solenoid. The solenoid frees the mechanical stops on the pilot quadrants.

J. A friction power lever on the pilot power quadrant applies friction to both power levers to hold the levers in place.

4-1-6. ENGINE POWER CONTROLS AND INDICATORS DESCRIPTION AND OPERATION (cont) 4-1-6


HYDROMECHANICAL UNIT (HMU)
POWER AVAILABLE SPINDLE (PAS) (INPUTS FROM PILOT AND CPG POWER LEVERS)
LOAD DEMAND SPINDLE (LDS) (INPUTS FROM COLLECTIVE SERVOACTUATOR OF HYDRAULIC SYSTEM)
CONTROL CABLE
HMU SHAFT
SPINDLE GEARBOX
SRCH LT
ON
OFF
STOW
RF OVRD
TADS
PNVS
GT JTSN
EXT
RET
L
R
PLRT
GRIP CONTROL COLLAR
UNLATCH
FRICTION INCREASE
ND
NU
RESET
COLLECTIVE STICK
DECREASE
RPM ADJUSTMENT
INCREASE
TURBINE SPEED CONTROL

MM04-1884B

4-1-6. ENGINE POWER CONTROLS AND INDICATORS DESCRIPTION AND OPERATION (cont) 4-1-6

K. The PAS and the LDS are on the HMU for both engines.

L. The PAS change linear movement of the control cables to rotary movement. They are connected to shafts in the HMU.

M. The engine power controls provide inputs to the HMU on each engine. The HMU controls the amount of fuel supplied to the engine.

N. Inputs are provided by the pilot and CPG power levers, collective pitch actuator, and the turbine speed control unit.

O. Inputs from the power levers are transferred by cables to the PAS. The inputs control the engine from off to 102 percent power (turbine speed).

P. Inputs from the collective actuator are transferred by cables to the LDS. The input causes the engine to maintain a fixed speed. The speed is maintained as collective pitch is increased or decreased. This prevents a drop in the main rotor rpm.

Q. A grip control collar switch is installed on the pilot and CPG collective sticks. The switches provide for rapid reduction of engine power.

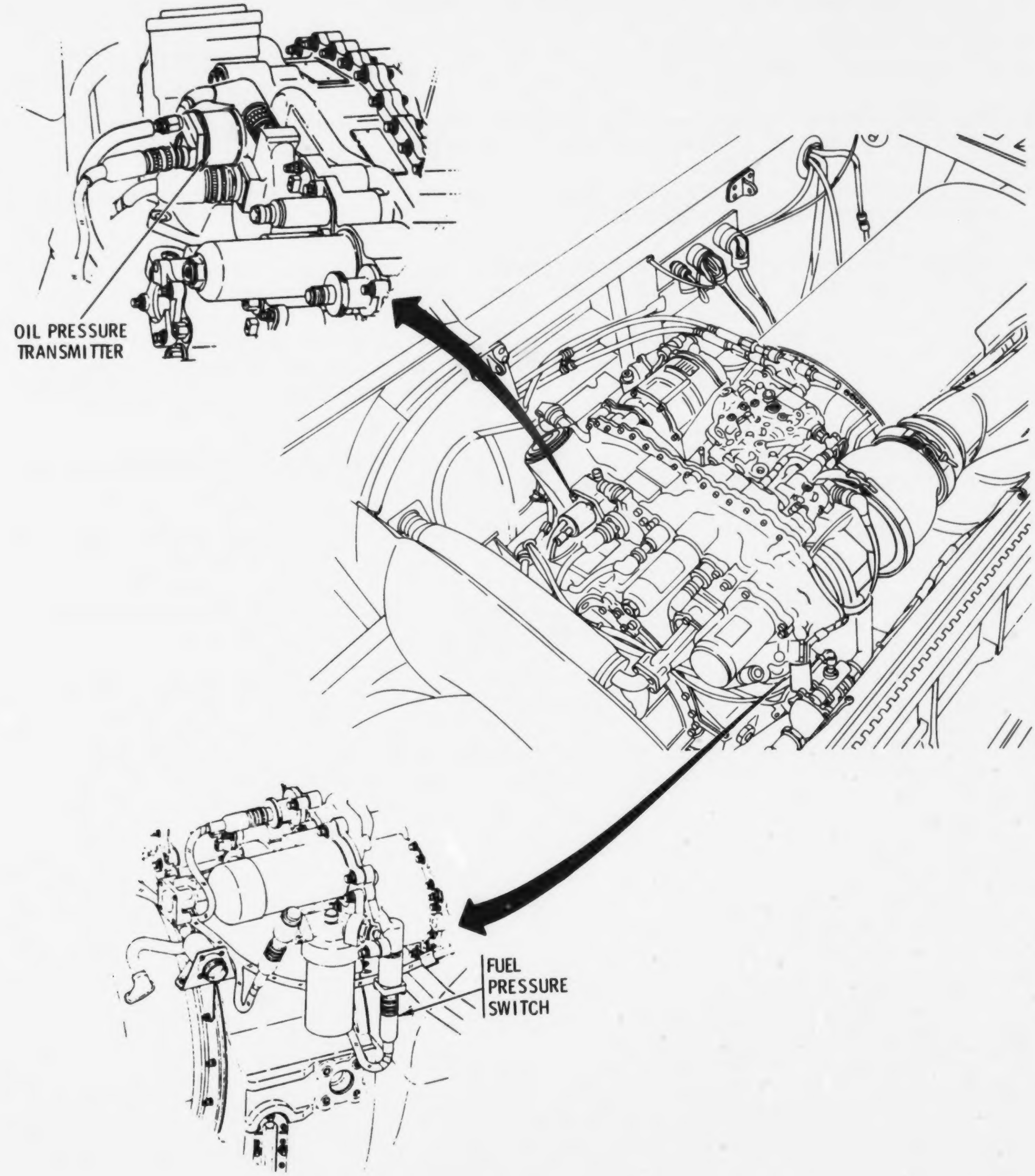
R. Pushing forward and twisting clockwise on either switch will cut engine power to idle.

S. Pushing forward and twisting counterclockwise on either switch will cause both engines to return to the previous power setting.

T. Engine turbine speed is controlled by the turbine speed control unit. The speed control unit limits the maximum turbine rpm of the engine.

U. The speed control unit sends a signal to the electrical control unit. The electrical control unit controls the flow of fuel to the engine.

4-1-6. ENGINE POWER CONTROLS AND INDICATORS DESCRIPTION AND OPERATION (cont) 4-1-6


OIL PRESSURE
TRANSMITTER
FUEL
PRESSURE
SWITCH

MM04-1885B

4-1-6. ENGINE POWER CONTROLS AND INDICATORS DESCRIPTION AND OPERATION (cont) 4-1-6

V. Engine indicators at the pilot and CPG stations receive inputs from the engine instrumentation system.

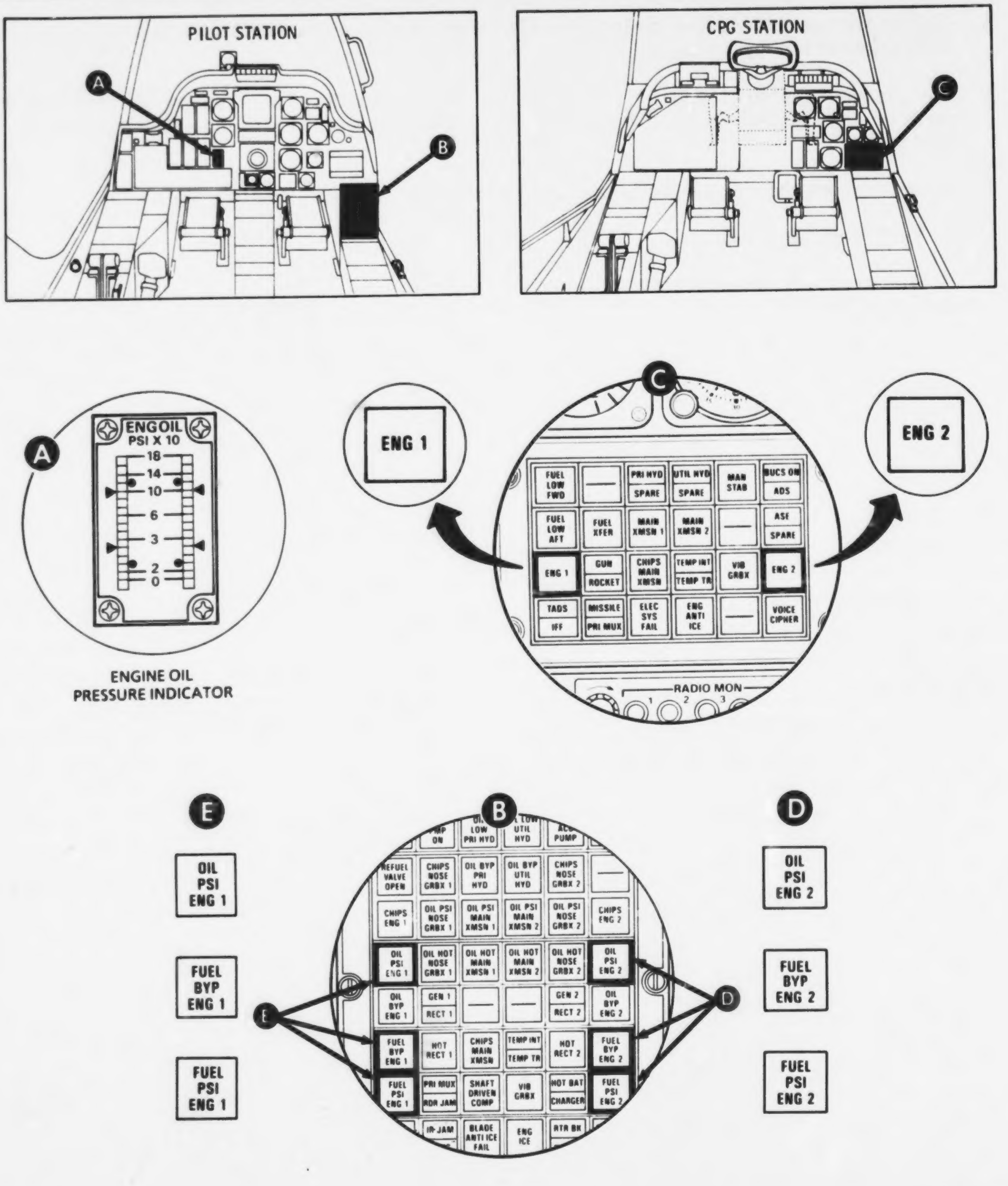
W. The system transmits engine oil pressure to an indicator on the pilot instrument panel. The system is also connected to lights on the pilot and CPG caution panels.

X. Major components of the instrumentation system for each engine are:

Fuel pressure switch

Oil pressure transmitter

4-1-6. ENGINE POWER CONTROLS AND INDICATORS DESCRIPTION AND OPERATION (cont) 4-1-6


PILOT STATION
A
B
CPG STATION
C
A
ENG OIL
PSI X 10
18
14
10
6
3
2
0
ENGINE OIL
PRESSURE INDICATOR
C
ENG 1
ENG 2
FUEL LOW FWD
PRI HYD
SPARE
UTIL HYD
SPARE
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
FUEL XFER
MAIN XMSN 1
MAIN XMSN 2
ASE
SPARE
ENG 1
GUN
ROCKET
CHIPS MAIN XMSN
TEMP INT
TEMP TR
VIB GRBX
ENG 2
TADS
IFF
MISSILE
PRI MUX
ELEC SYS FAIL
ENG ANTI ICE
VOICE CIPHER
RADIO MON
1
2
3
E
B
D
OIL PSI ENG 1
FUEL BYP ENG 1
FUEL PSI ENG 1
OIL PSI ENG 2
FUEL BYP ENG 2
FUEL PSI ENG 2
PUMP ON
OIL LOW PRI HYD
OIL LOW UTIL HYD
ACC PUMP
REFUEL VALVE OPEN
CHIPS NOSE GRBX 1
OIL BYP PRI HYD
OIL BYP UTIL HYD
CHIPS NOSE GRBX 2
CHIPS ENG 1
OIL PSI NOSE GRBX 1
OIL PSI MAIN XMSN 1
OIL PSI MAIN XMSN 2
OIL PSI NOSE GRBX 2
CHIPS ENG 2
OIL PSI ENG 1
OIL HOT NOSE GRBX 1
OIL HOT MAIN XMSN 1
OIL HOT MAIN XMSN 2
OIL HOT NOSE GRBX 2
OIL PSI ENG 2
OIL BYP ENG 1
GEN 1
RECT 1
GEN 2
RECT 2
OIL BYP ENG 2
E
D
FUEL BYP ENG 1
HOT RECT 1
CHIPS MAIN XMSN
TEMP INT
TEMP TR
HOT RECT 2
FUEL BYP ENG 2
FUEL PSI ENG 1
PRI MUX
RDR JAM
SHAFT DRIVEN COMP
VIB GRBX
HOT BAT
CHARGER
FUEL PSI ENG 2
IR JAM
BLADE ANTI ICE FAIL
ENG ICE
RTR BK

MM04-1886B

4-1-6. ENGINE POWER CONTROLS AND INDICATORS DESCRIPTION AND OPERATION (cont) 4-1-6

Y. The fuel pressure switch transmits low engine fuel pressure indications to the pilot **FUEL PSI ENG 1** and **FUEL PSI ENG 2** caution lights.

Z. When the fuel pressure is increased to 11 psi, the fuel pressure switch opens and the lights will not light. If the pressure drops to 8 or 9 psi, the switch will close and the lights will light.

AA. The engine oil pressure indicator transmits engine oil pressure indications to the pilot oil pressure indicator.

AB. The engine oil pressure indicator translates engine oil pressure into an electrical signal to the oil pressure indicator.

Section II. ENGINE MAINTENANCE

4-2-1. ENGINE CLEANING 4-2-1

Refer to TM 55-2840-248-23 for engine cleaning.

END OF TASK

4-2-2. ENGINE INSPECTION 4-2-2

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanics	5180-00-323-4692

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1500-204-25/1
TM 55-1500-323-24
TM 55-2840-248-23

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access panels removed as necessary

1. **Check engine tubes, hoses, and fittings for cracks, nicks, scratches, chafing and dents.**
   a. No cracks allowed.
   b. If depth of defect can be measured on fuel carrying tubes, no damge allowed.
   c. If repair has not been previously done in same area, on non-fuel-carrying tubes, nicks, scratches, and chafing not to exceed **0.005 INCH** are repairable.
   d. On straight or curved sections of tubing with a radius over twice tube OD, replace tubing with dents over 20 percent of tube OD.
   e. On curved tubing with a radius less than twice tube OD, replace tubing with dents over 10 percent of tube OD.
2. **Check hoses for kinks and buckling.** None allowed.
3. **Check brackets and support clips for cracks** (TM 55-1500-204-25/1).
4. **Check for fuel or oil leaks.** None allowed.
5. **Check for loose, broken, or missing nuts and bolts.** None allowed.
6. **Check quick-release pins in HCU and anti-ice and start valve linkage for improper engagement.**
7. **Check fuel and oil filters for indication of impending bypass.** (Buttons must not be popped).
8. **Check engine mounts for cracks and voids.** None allowed.
9. **Check engine mount bearings** (TM 55-1500-204-25/1).
   a. Axial play. None allowed.
   b. Radial play. **0.0035 INCH MAX.**
10. **Refer to** TM 55-2840-248-23 **for repair limits on engine components.**
11. **Check electrical connectors for corroded, bent, broken, loose, or missing pins. Check wire harnesses for chafing and loose mounting** (TM 55-1500-323-24).
12. **Check access panels as necessary** (2-2-2).

GO TO NEXT PAGE

13. Aft engine mount pins and bushings inspection procedures.

a. Perform visual inspection of aft engine mount pins (TM 55-1520-238-23, paragraph 2-2-2 for access), two per aircraft (TM 55-1520-238-23P, figure 231, item 13). Determine which part number is installed. Proceed to paragraph 13.b. or 13.c. depending on the part number.

b. If part number SL55005, Shur-Lok is installed, inspect for lanyard wrap up. Proceed as follows:

(1) If lanyard wrap up has occurred, clean and apply torque stripes across the edge of the bushing (TM 55-1520-238-23P, figure 235, item 12) and the adjacent area of the bellcrank (TM 55-1520-238-23P, figure 235, item 11). Apply these stripes on both sides of each aft engine mount. Inspect torque stripes prior to each flight for the next 10 flight hours to determine if the bushings are rotating with respect to the bellcrank. If bushing rotates perform correction of paragraph 14.

(2) If lanyard wrap has not occurred no further maintenance action is required.

c. If part number 53659, Avibank or part number ABC6669, Adjustable Bushing Corp. is installed, proceed as follows:

(1) Install Shur-Lok Pin, part number SL55005, when available. Upon installation of Shur-Lok Pin, perform inspection of paragraph 13.b. All replacement Shur-Lok Pins must meet the following torque check prior to installation.

(a) Unlock pin.

(b) Using a torque wrench, check torque on mount pin in one of two ways:

1. Check/install lock pin in aft engine mount, with no weight on pin, note minimum torque required to engage the lock mechanism.

2. Drill a 3/8 inch hole in a piece of metal barstock of sufficient thickness for the mount pin to seat. Install pin in barstock and note the minimum torque required to engage the lock mechanism.

(c) The minimum acceptable torque in both cases is **55 INCH-POUNDS.**

(2) If Shur-Lok Pins are not available and engine mount pin is experiencing rotation or lanyard wrap up, continue to visually inspect prior to each flight. Unwrap the lanyard until replacement pins are available.

14. Correction procedures for aft engine mount pins and bushings inspection.

a. If the inspection procedure of paragraph 13.b. indicates that the bushing is rotating within the engine mount bellcrank, perform the following corrective action:

(1) Locate the aft primary engine mount pin per paragraph 13.a.

GO TO NEXT PAGE

(2) Support the engine as necessary and remove the aft primary engine mount pin (TM 55-1520-238-23, paragraph 4-2-9).

(3) Remove the aft primary engine mount (TM 55-1520-238-23, paragraph 4-9-1, steps A.2. thru A.4.).

(4) With the aft primary engine mount removed from the aircraft, remove the two engine mount bushings (TM 55-1520-238-23P, figure 235, item 12) from the mount.

WARNING

Cleaning solvents are flammable and toxic. Insure adequate ventilation. Avoid prolonged breathing of vapors and contact with skin or eyes. If dizziness and/or nausea occurs or if solvent contacts the eyes, flush eyes with water. Get immediate medical aid. When working with cleaning solvents, wear protective clothing and guards.

(5) Clean the outside diameter of the bushings and the bore of the bellcrank with TRICHLOROETHANE (item E39, paragraph 1-4-1, TM 55-1520-238-23), or equivalent.

(6) Apply Loctite medium strength retaining compound per MIL-S-22473, NSN 8030-00-081-2339, to the outside diameter of the two bushings and reinstall the bushings into the bellcrank. Wipe off any excessive Loctite. Insure that the bushing bore is clear of loctite. Allow Loctite to cure.

(7) Reinstall the engine mount (TM 55-1520-238-23, paragraph 4-9-1, step D.1. thru D.5.

(8) Reinstall the aft primary engine mount pin (TM 55-1520-238-23, paragraph 4-2-45, step 2).

(9) Apply torque stripe per paragraph 13.a.(2).

(10) Monitor the aft primary engine mount pin and bushing for 10 flight hours to insure bushing rotation has been corrected. If no further rotation occurs, no further maintenance action is required.

(11) If rotation continues after correction procedures have been accomplished, call the Technical Point of contact, Mr. Gene Doerr, AMSAV-EIA, AUTOVON 693-1679 or Commercial (314) 263-1679.

15. Check engine turbine case for loose or broken third stage nozzle bolts and case for cracks.

END OF TASK

4-2-3. NO. 1 ENGINE REMOVAL

This task covers:

4-2-4. No. 1 Engine Removal - Pilot Station
4-2-5. No. 1 Engine Removal - Upper Disconnection
4-2-6. No. 1 Engine Removal - Lower Disconnection
4-2-7. No. 1 Engine Removal - Remove from Helicopter

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanics	5180-00-323-4692
Aviation Ground Power Unit (AGPU)	1730-01-144-1897
Sling, Engine Lifting	4920-01-108-3484
Kit, Aircraft Adapter	1730-01-240-6743

Personnel Required:

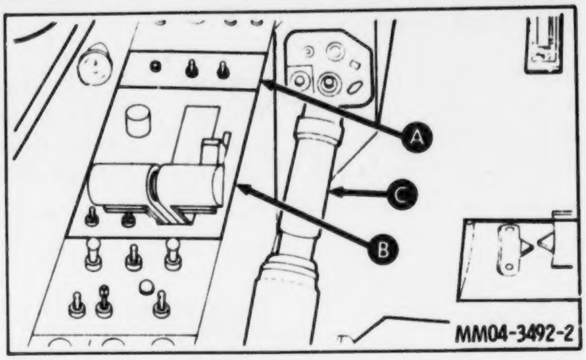
67R10 Attack Helicopter Repairer (3)
Two to assist

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access doors LN1, LN3, and LN4 opened
6-2-2	No. 1 drive shaft removed
1-5-11	Fuel system vented
1-5-13	No. 1 engine oil system drained
1-7-42	Maintenance crane installed

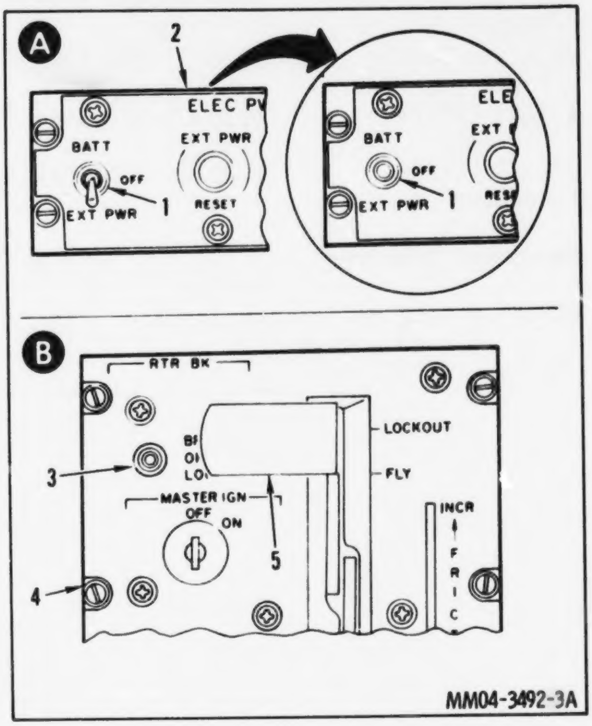
GO TO NEXT PARAGRAPH

4-2-4. NO. 1 ENGINE REMOVAL - PILOT STATION 4-2-4


A
C
B
MM04-3492-2

1. **Apply electrical (para 1-7-16) and hydraulic (para 1-7-19) power to helicopter. Observe all safety precautions.**

2. **Enter pilot station (para 1-7-1). Observe all safety precautions.**

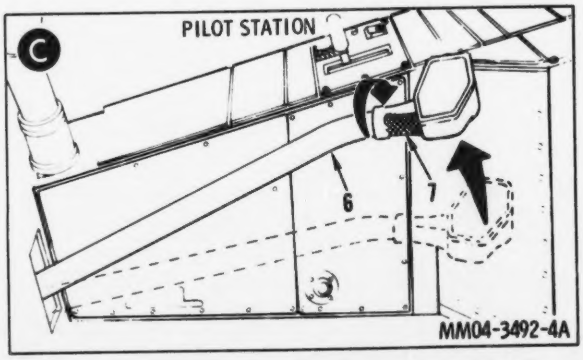

A
2
ELEC PW
BATT
OFF
EXT PWR
RESET
EXT PWR
1
ELE
BATT
OFF
EXT
EXT PWR
1
RES
B
RTR BK
BR
ON
LO
LOCKOUT
FLY
MASTER IGN
OFF
ON
3
5
4
INCR
FRIC
MM04-3492-3A

3. **Set ELEC PWR control switch (1) on ELEC PWR check panel (2) to EXT PWR.**

4. **Set RTR BK switch (3) on power quadrant panel (4) to OFF.**

5. **Set switch (1) on panel (2) to OFF.**

6. **Set No. 1 power lever (5) on panel (4) to LOCKOUT.**

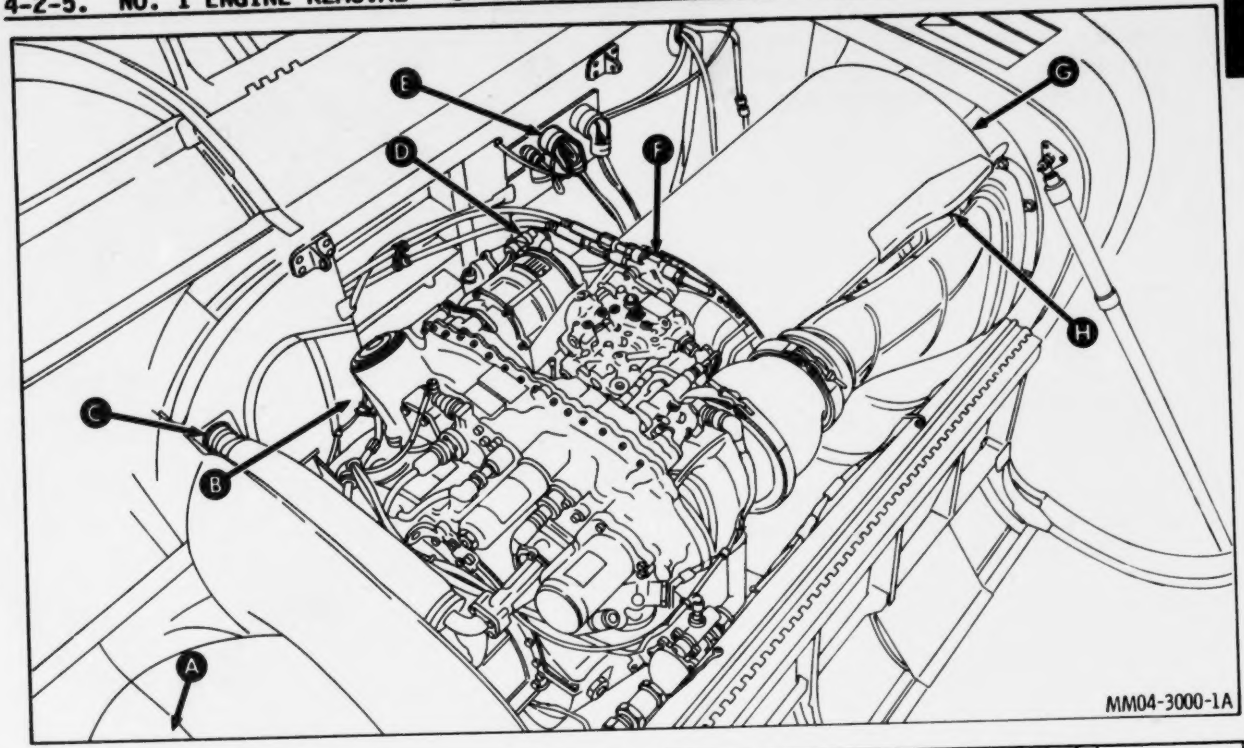

PILOT STATION
C
6
7
MM04-3492-4A

7. **Move collective stick (6) to full up position.** Rotate flight gear handle (7) counterclockwise to lock.

8. **Disconnect AGPU from helicopter** (para 1-7-16 and 1-7-19).

GO TO NEXT PARAGRAPH

4-2-5. NO. 1 ENGINE REMOVAL - UPPER DISCONNECTION


E
G
D
F
H
C
B
A
MM04-3000-1A

1. **Detach connectors.** Detach connector P61 (1) from connector J61 (2) and connector P47 (3) from connector J47 (4).

2. **Detach wire harness (5) from airframe (6).**

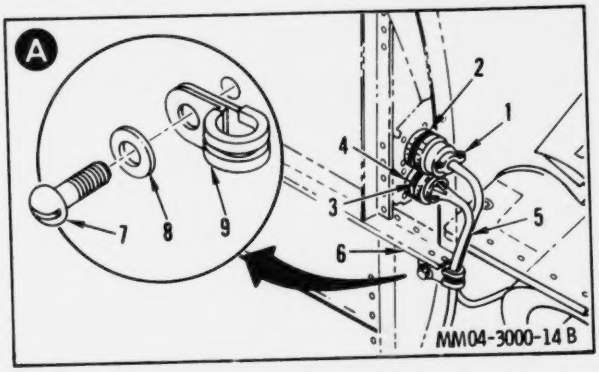
   a. Remove screw (7), washer (8), and clamp (9).

   b. Remove clamp (9) from wire harness (5).

3. **Disconnect fuel hose (10) from breakaway valve (11).**

   a. Slide ratchet sleeve (12) away from adapter (13) to release locking teeth.

   b. Turn sleeve (12) counterclockwise until free.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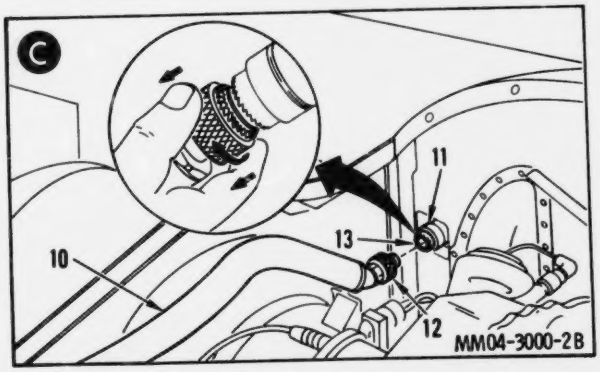
MM04-3000-14 B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MM04-3000-2B

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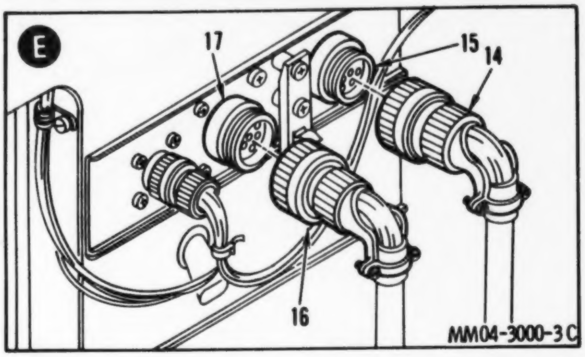
4-2-5. NO. 1 ENGINE REMOVAL - UPPER DISCONNECTION (cont) 4-2-5

4. **Detach connector P24 (14) from connector J24 (15) and connector P22 (16) from connector J22 (17).**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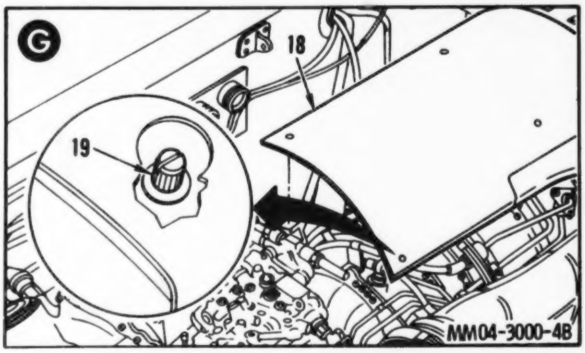
MM04-3000-3C

5. **Remove engine shroud (18).** Release four turnlock fasteners (19).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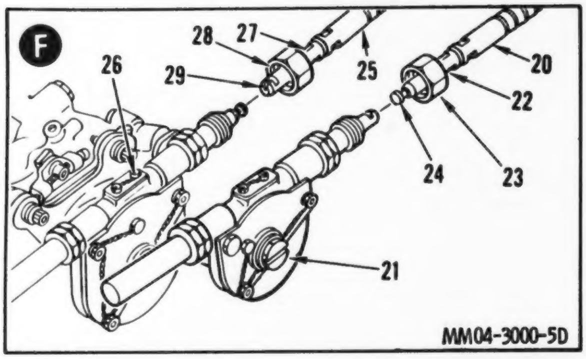
MM04-3000-4B

6. **Disconnect load demand cable assembly (20) from load demand spindle gearbox (21).**
    a. Hold cable housing flats (22).
    b. Remove coupling nut (23).
    c. Pull cable (24) inboard and disconnect.

7. **Disconnect power available cable (25) from PAS gearbox (26).**
    a. Hold cable housing flats (27).
    b. Remove coupling nut (28).
    c. Pull cable (29) inboard and disconnect.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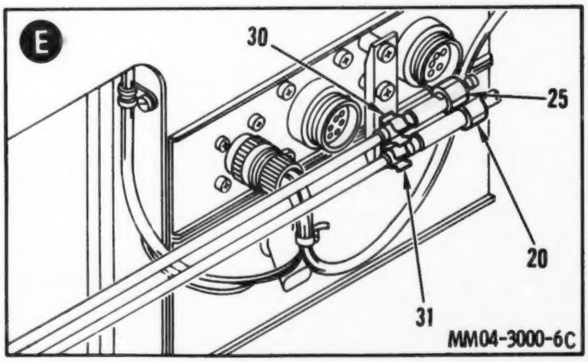
MM04-3000-5D

8. **Stow power available cable (25) in upper clip (30).**

9. **Stow load demand cable (20) in lower clip (31).**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MM04-3000-6C

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4-2-5. NO. 1 ENGINE REMOVAL - UPPER DISCONNECTION (cont) 4-2-5

10. **Remove coupling (32) from primary nozzle (33).**

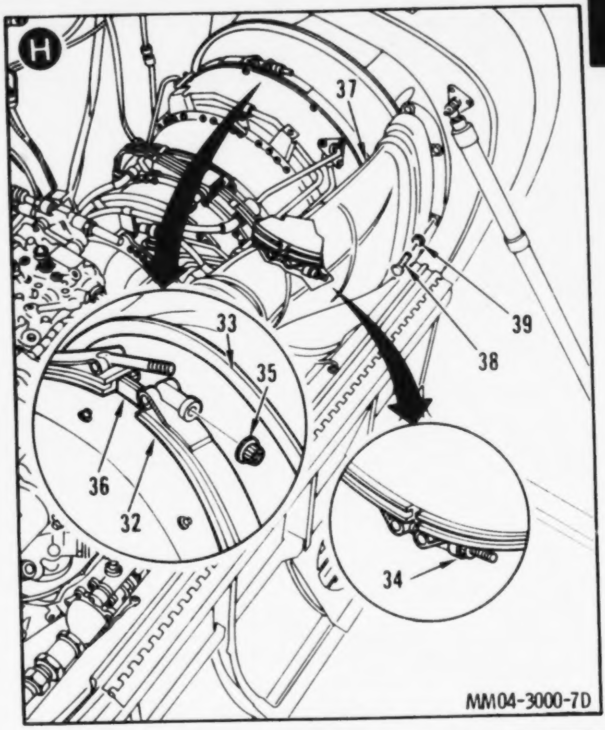
    a. Loosen lower clamp nut (34).

    b. Remove upper clamp nut (35).

    c. Slide coupling (32) aft on nozzle (33) until it clears engine flange (36).

11. **Disconnect air duct (37) from nozzle (33).** Remove three screws (38) and washers (39).

12. **Move primary nozzle (33) aft until it clears flange (36).**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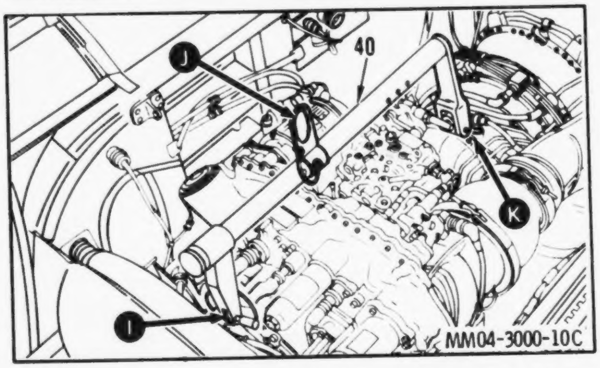
13. **Install engine handling adapter (40).**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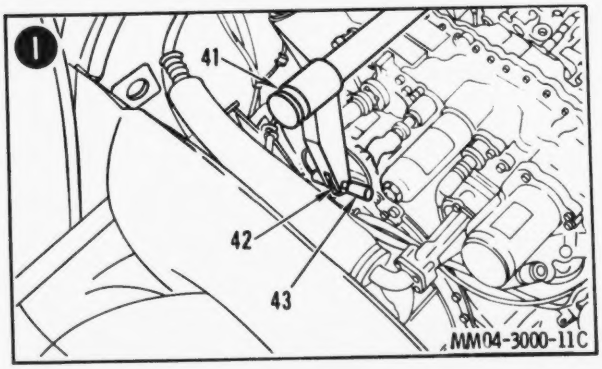
MM04-3000-10C

    a. Aline forward hanger link (41) with forward lifting lug (42).

    b. Install support pin (43) through link (41) and lug (42).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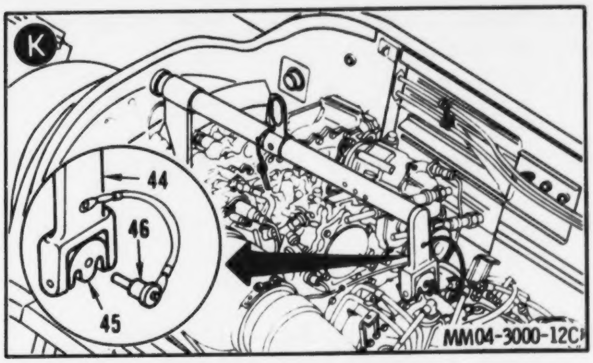
MM04-3000-11C

GO TO NEXT PAGE

4-2-5. NO. 1 ENGINE REMOVAL - UPPER DISCONNECTION (cont) 4-2-5

c. Aline aft hanger link (44) with aft lifting lug (45).

d. Install aft support pin (46) through link (44) and lug (45).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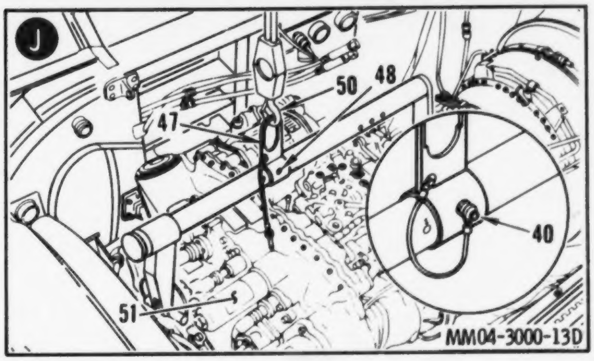
MM04-3000-12C

e. Position lifting eye (47) at hole No. 2 (48).

f. Insert pin (49) through sling (40) and hole (48).

14. **Insert aircraft mounted crane hook (50) into eye (47).**

15. **Lift engine (51) with crane until weight is off inboard engine mount (52) and outboard engine mount (53).**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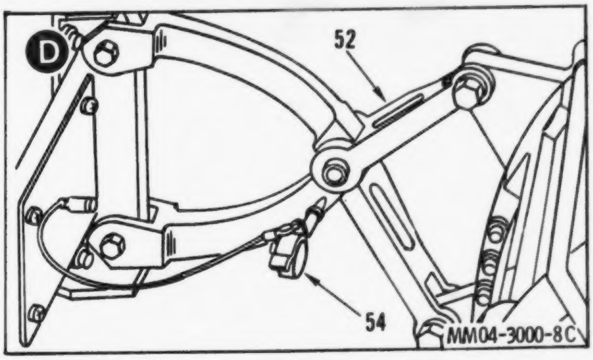
MM04-3000-13D

16. **Remove support pin (54) from mount (52).** Unlock and pull pin (54).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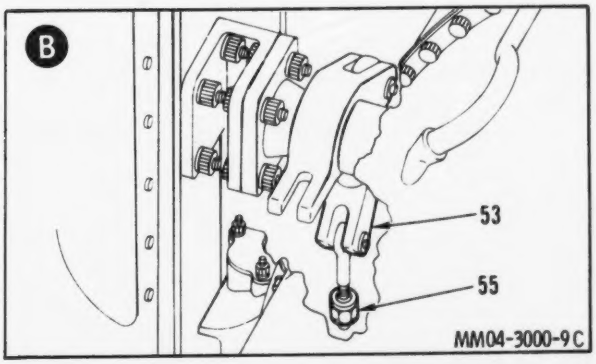
MM04-3000-8C

17. **Unlatch and open mount (53).** Loosen nut (55) and open mount (53).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MM04-3000-9C

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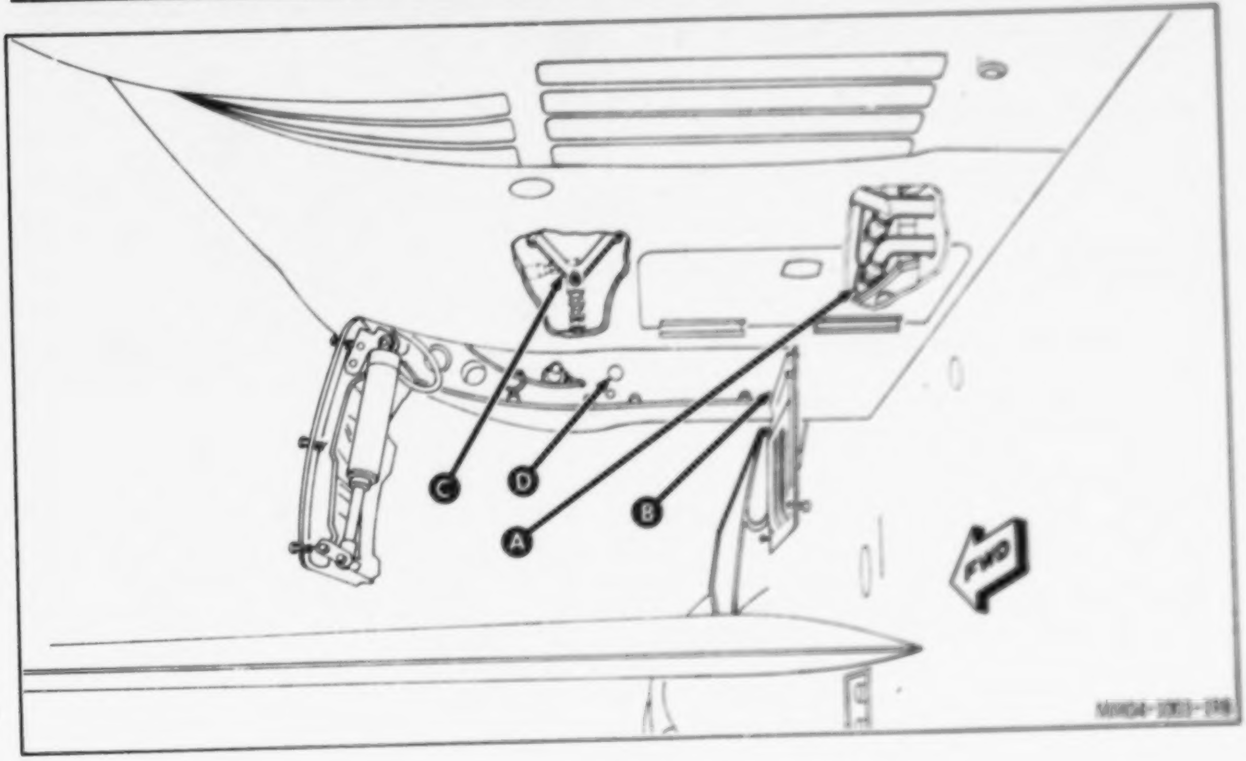
4-2-6. NO. 1 ENGINE REMOVAL - LOWER DISCONNECTION



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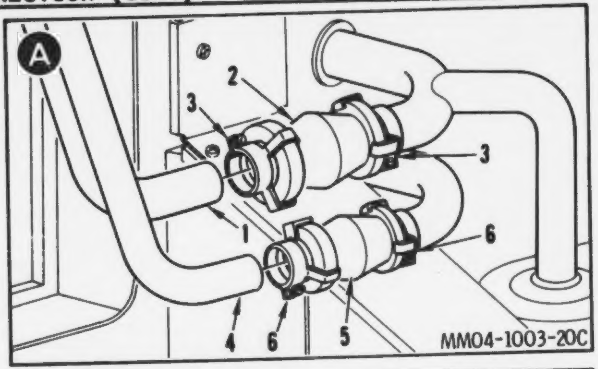
4-2-6. NO. 1 ENGINE REMOVAL - LOWER DISCONNECTION (cont) 4-2-6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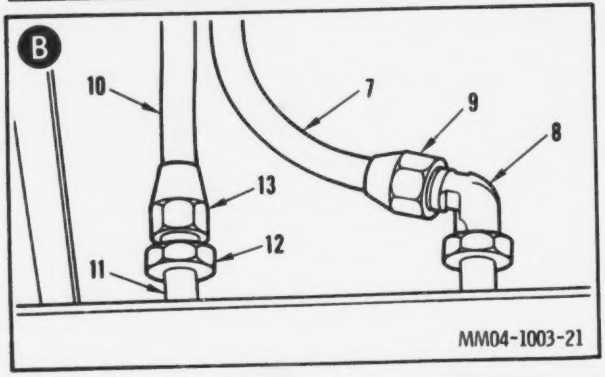
MM04-1003-20C

1. **Disconnect starter air tube (1) from coupling (2).**
   a. Loosen two clamp screws (3).
   b. Slide coupling (2) aft until tube (1) is free.
2. **Disconnect bleed air tube (4) from coupling (5).**
   a. Loosen two clamp screws (6).
   b. Slide coupling (5) aft until tube (4) is free.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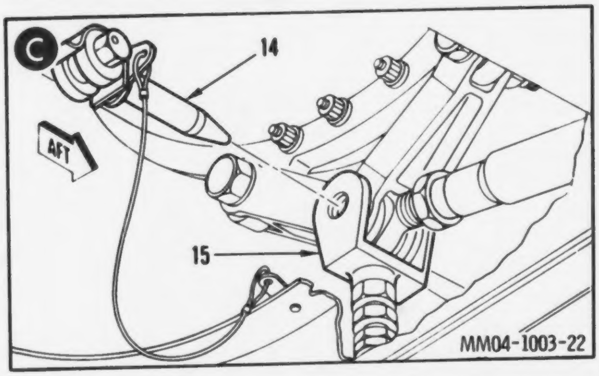
MM04-1003-21

3. **Disconnect drain hose (7) from elbow fitting (8).** Hold elbow (8). Remove nut (9).
4. **Disconnect drain tube (10) from fitting (11).** Hold hex (12). Remove nut (13).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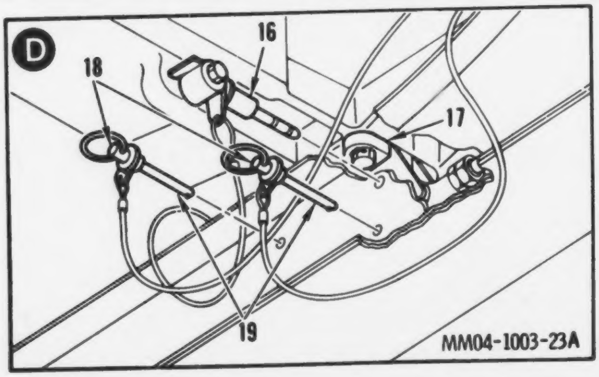
MM04-1003-22

5. **Remove support pin (14) from aft lower engine mount (15).** Unlock and pull pin (14).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MM04-1003-23A

6. **Remove support pin (16) from forward lower engine mount (17).** Push release button (18), pull pins (19).

GO TO NEXT PARAGRAPH

4-2-7. NO. 1 ENGINE REMOVAL - REMOVE FROM HELICOPTER 4-2-7

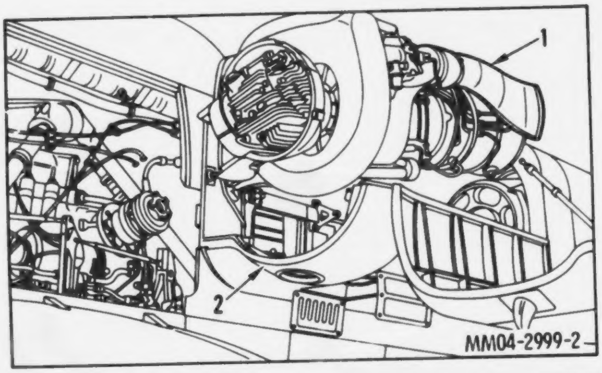
WARNING

Hoisted components, if allowed to fall, can cause injury or death to personnel. Keep away from component mounting surfaces and loaded crane boom. If injury occurs, seek medical aid.

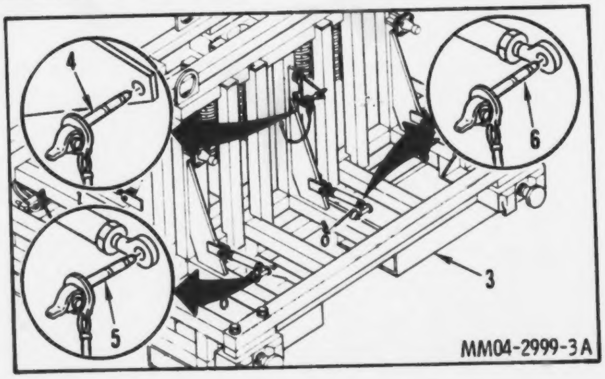
CAUTION

When lifting engine from nacelle, make sure that all hoses, electrical plugs, lines, and cables are clear of obstructions.

1. **Lift engine (1) straight up and out of nacelle (2).** Use aircraft mounted crane.



2. **Prepare engine handling adapter (3).** Remove three support pins (4), (5), and (6).



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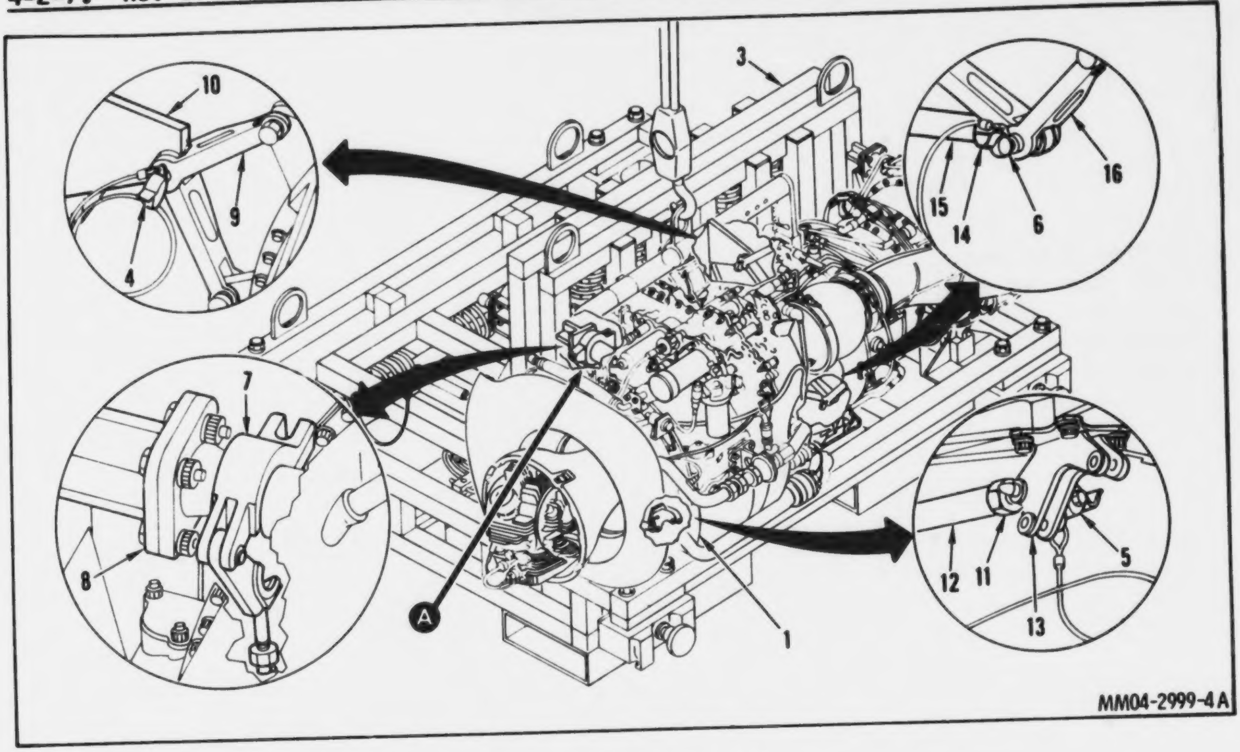


3. **Install engine (1) on engine handling adapter (3).**

   a. Aline forward inboard engine mount (7) with adapter forward inboard support (8).

   b. Aline aft inboard engine mount (9) with adapter aft inboard support (10).

   c. Install support pin (4) through support (10) and mount (9).

   d. Loosen jam nuts (11) on adapter lower forward support (12). Adjust support (12) to aline with engine mount (13).

   e. Install support pin (5) through support (12) and mount (13).

   f. Loosen jam nuts (14) on adapter aft lower support (15). Adjust support (15) to aline with engine mount (16).

   g. Install support pin (6) through support (15) and mount (16).

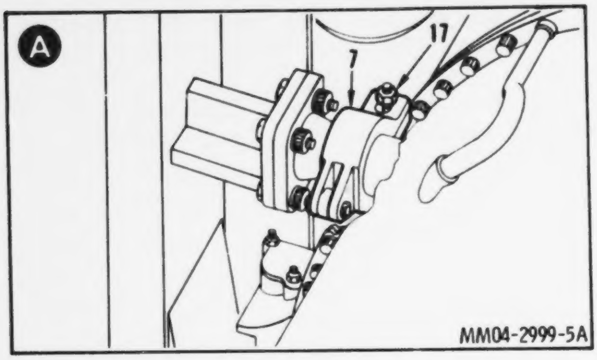
   h. Lock support pins (4), (5), and (6).

GO TO NEXT PAGE

4-2-7. NO. 1 ENGINE REMOVAL - REMOVE FROM HELICOPTER (cont) 4-2-7

i. Close forward inboard mount (7).

j. Tighten clamp nut (17).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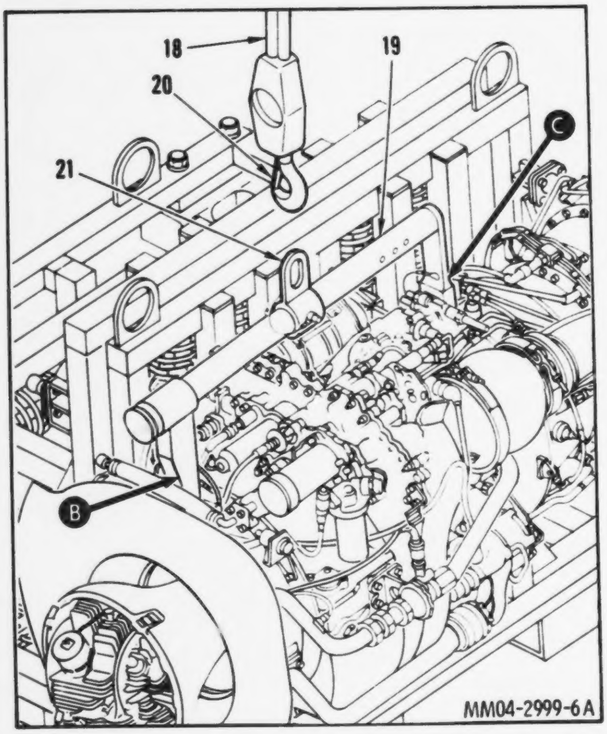
MM04-2999-5A

4. Release tension on lifting cable (18). Use aircraft mounted crane.

5. Remove sling (19) from engine (1).

   a. Remove hook (20) from lifting eye (21).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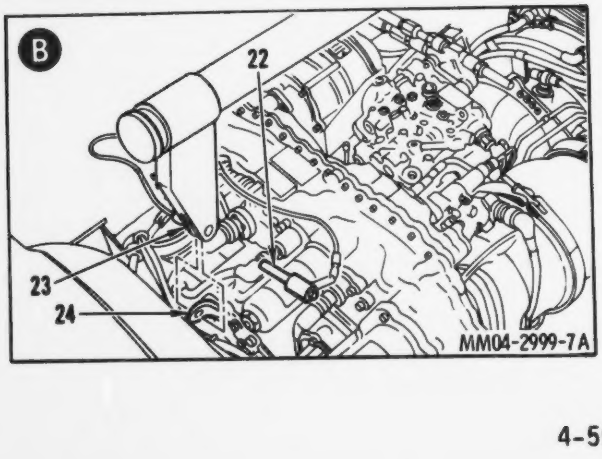
MM04-2999-6A

   b. Remove pin (22) from forward hanger link (23) and lifting lug (24).


B
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MM04-2999-7A

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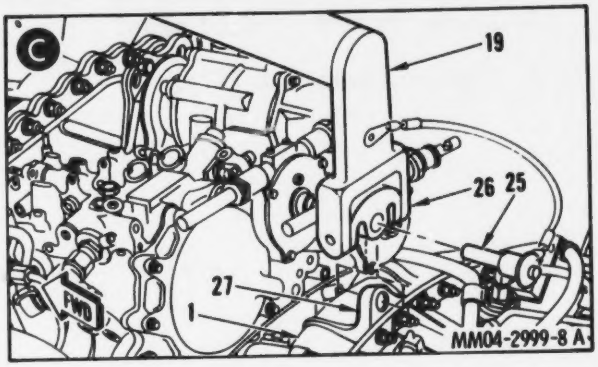
c. Remove pin (25) from aft hanger link (26) and lifting lug (27).

d. Remove sling (19) from engine (1).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MM04-2999-8 A

END OF TASK

4-2-8. NO. 2 ENGINE REMOVAL 4-2-8

This task covers:

4-2-9. No. 2 Engine Removal - Upper Disconnection
4-2-10. No. 2 Engine Removal - Lower Disconnection
4-2-11. No. 2 Engine Removal - Remove from Helicopter

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Sling, Engine Lifting	4920-01-108-3484
Kit, Aircraft Adapter	1730-01-240-6743

Personnel Required:

67R10 Attack Helicopter Repairer (3)
Two to assist

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access doors RN1, RN3, and RN4 opened, and R200 removed.
6-2-2	No. 2 drive shaft removed
1-5-11	Fuel system vented
1-7-42	Maintenance crane installed
1-5-13	No. 2 engine oil system drained

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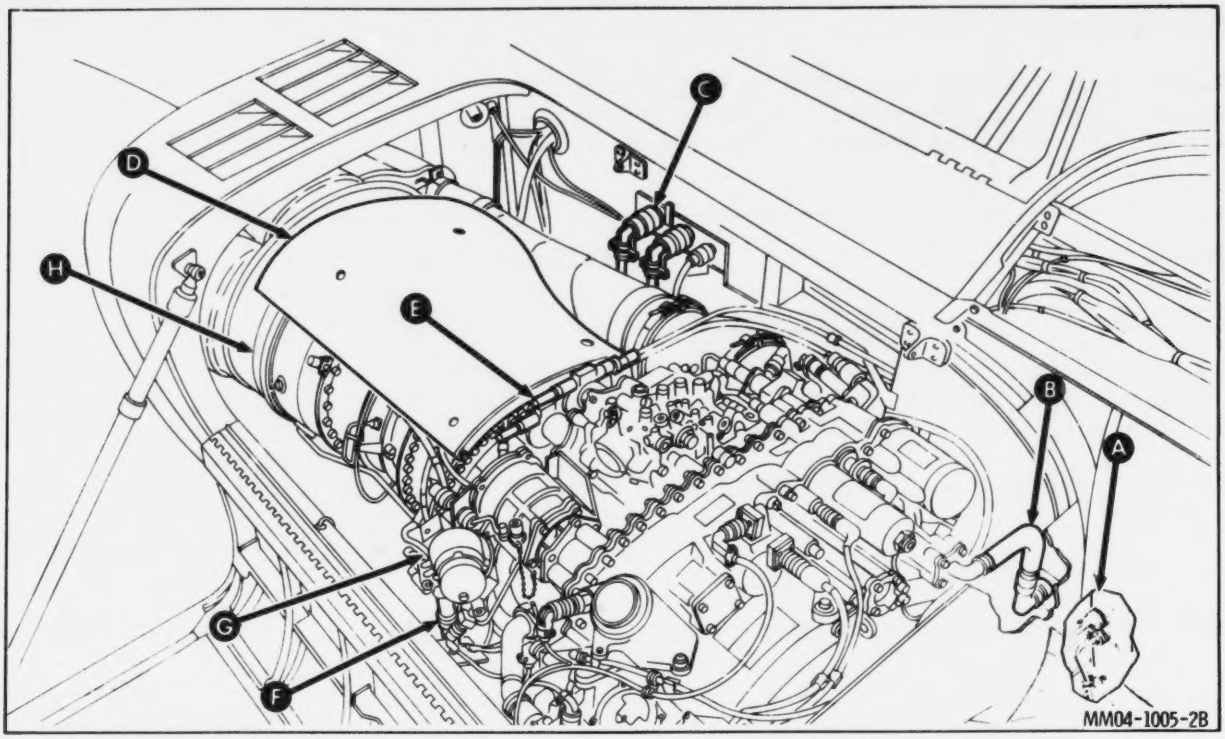
4-2-9. NO. 2 ENGINE REMOVAL - UPPER DISCONNECTION 4-2-9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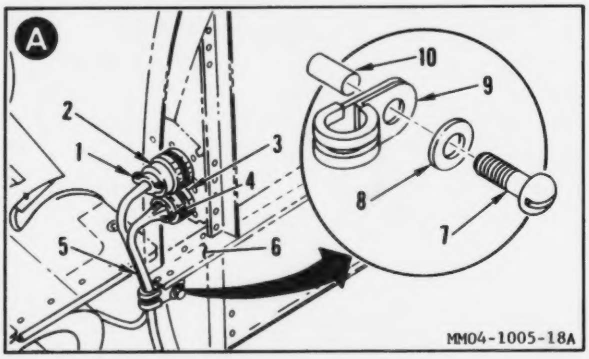
MM04-1005-2B

1. **Detach connectors.** Detach connector P60 (1) from connector J60 (2) and connector P48 (3) from connector J48 (4).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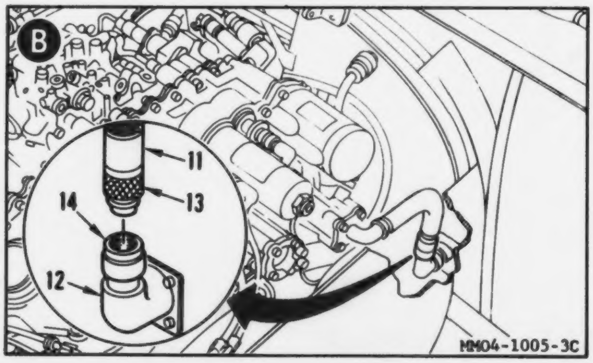
MM04-1005-18A

2. **Detach wire harness (5) from airframe (6).**

   a. Remove screw (7), washer (8), clamp (9) and spacer (10).

   b. Remove clamp (9) from wire harness (5).


B
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MM04-1005-3C

3. **Disconnect fuel hose (11) from breakaway valve (12).**

   a. To release locking teeth slide ratchet sleeve (13) away from adapter (14)

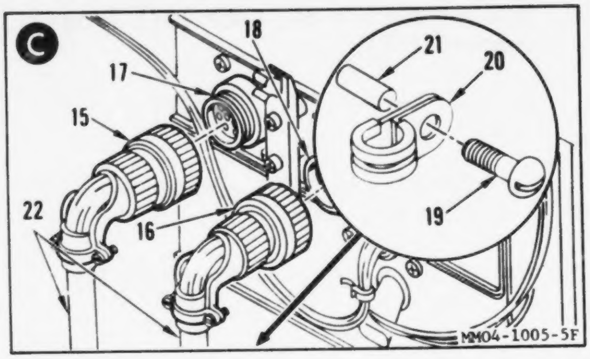
   b. Turn sleeve (13) counterclockwise until free.

GO TO NEXT PAGE

4. **Detach two aft connectors P22 (15) and P24 (16) from connectors J22 (17) and J24 (18).** Identify connectors.

   a. Remove screw (19), clamp (20), and spacer (21).

   b. Remove clamp (20) from engine wiring (22).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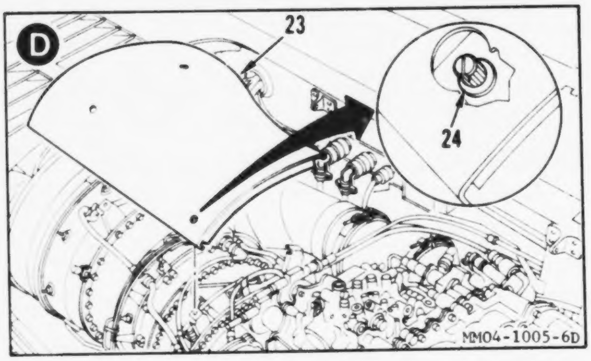
MM04-1005-5F

5. **Remove engine shroud (23).** Release four turnlock fasteners (24).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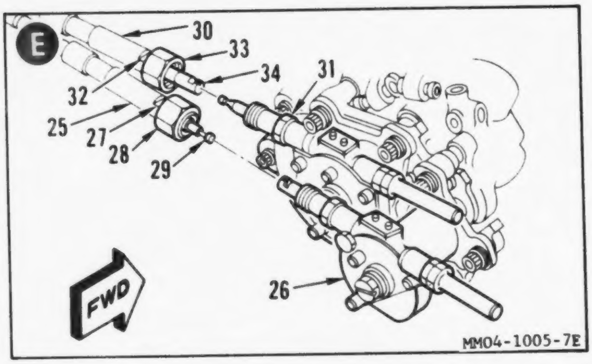
MM04-1005-6D

6. **Disconnect load demand cable (25) from load demand spindle gearbox (26).**

   a. Hold cable housing flats (27).

   b. Remove coupling nut (28).

   c. Pull cable (29) inboard and disconnect.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MM04-1005-7E

7. **Disconnect power available cable (30) from power available spindle gearbox (31).**

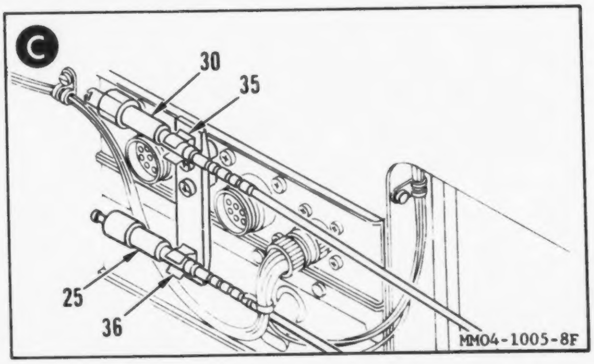
   a. Hold cable housing flats (32).

   b. Remove coupling nut (33).

   c. Pull cable (34) inboard and disconnect.

8. **Stow power available cable (30) in upper clip (35).**

9. **Stow load demand cable (25) in lower clip (36).**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MM04-1005-8F

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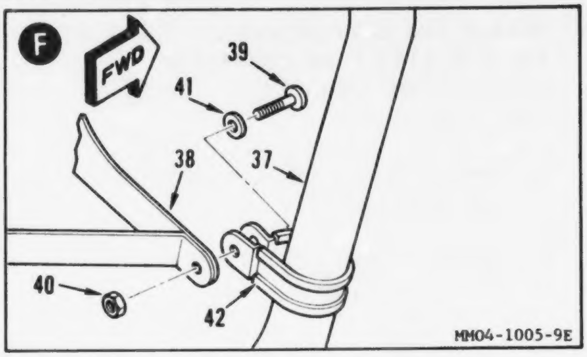
4-2-9. NO. 2 ENGINE REMOVAL - UPPER DISCONNECTION (cont) 4-2-9

10. **Remove starter air tube (37) from support (38).**

    a. Hold screw (39). Remove nut (40).

    b. Remove screw (39) and washer (41) from clamp (42).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MM04-1005-9E

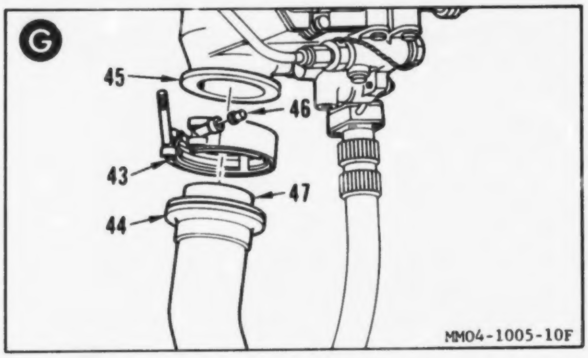
11. **Remove coupling (43) from starter air tube (44) and regulator valve (45).**

    a. Remove nut (46).

    b. Remove coupling (43) from air tube (44) and valve (45).

    c. Remove insert (47) from air tube (44).

    d. Check air tube (44) for holes or kinks. None allowed.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MM04-1005-10F

12. **Remove coupling (48) from primary nozzle (49).**

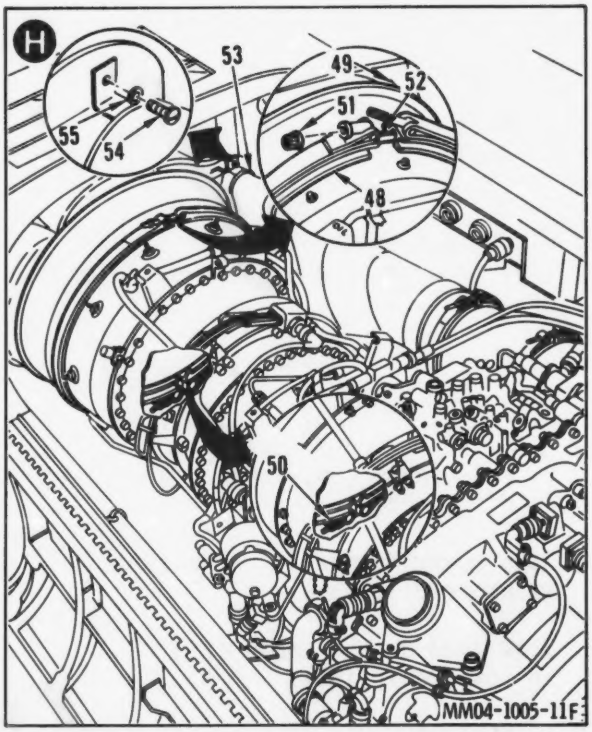
    a. Loosen lower clamp nut (50).

    b. Remove upper clamp nut (51).

    c. Slide coupling (48) aft onto nozzle (49) until clear of engine flange (52).

13. **Disconnect air duct (53) from primary nozzle (49).** Remove three screws (54) and washers (55).

14. **Move primary nozzle (49) aft until clear of engine flange (52).**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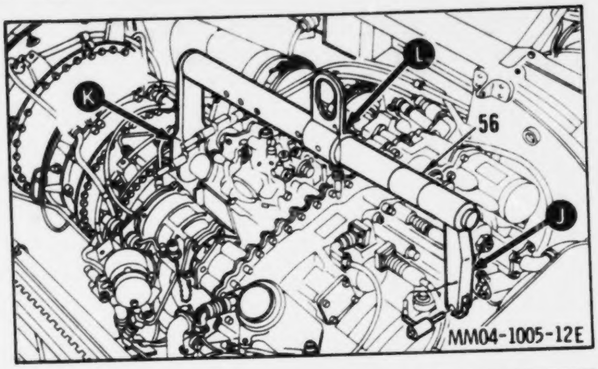
4-2-9. NO. 2 ENGINE REMOVAL - UPPER DISCONNECTION (cont) 4-2-9

15. **Install engine handling adapter (56).**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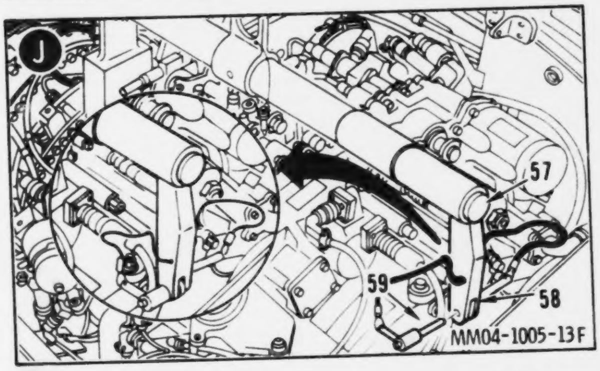
MM04-1005-12E

a. Aline forward hanger link (57) with forward lifting lug (58).

b. Install support pin (59) through link (57) and lug (58).


J
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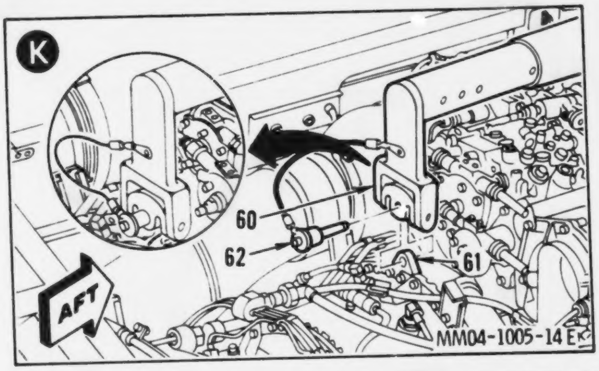
MM04-1005-13F

c. Aline aft hanger link (60) with aft lifting lug (61).

d. Install support pin (62) through link (60) and lug (61).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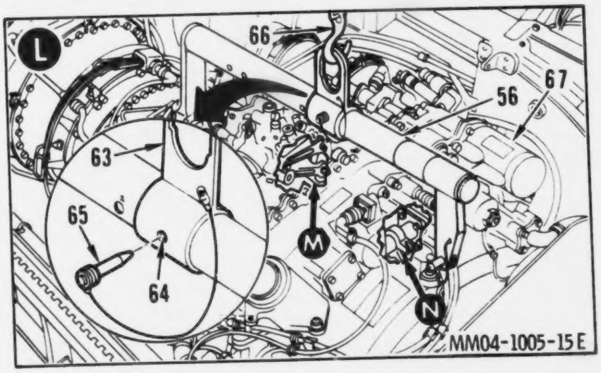
AFT
MM04-1005-14E

e. Position lifting eye (63) at hole 2 (64).

f. Insert pin (65) through adapter (56) and hole 2 (64).

16. **Insert crane (66) hook into eye (63).**

17. **Lift engine (67) with crane until weight is off mounts.**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MM04-1005-15E

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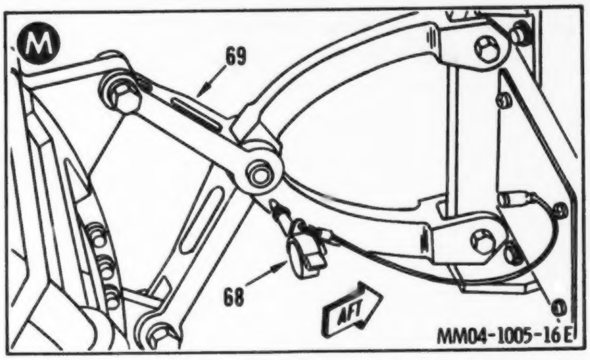
4-2-9. NO. 2 ENGINE REMOVAL - UPPER DISCONNECTION (cont) 4-2-9

18. **Remove support pin (68) from aft inboard engine mount (69).** Unlock pin (68).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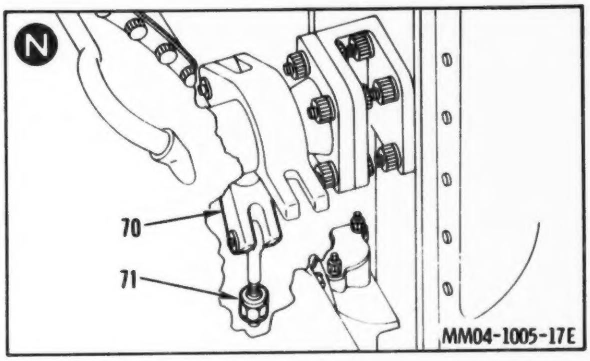
MM04-1005-16E

19. **Unlatch and open forward inboard engine mount (70).** Loosen nut (71) and open mount (70).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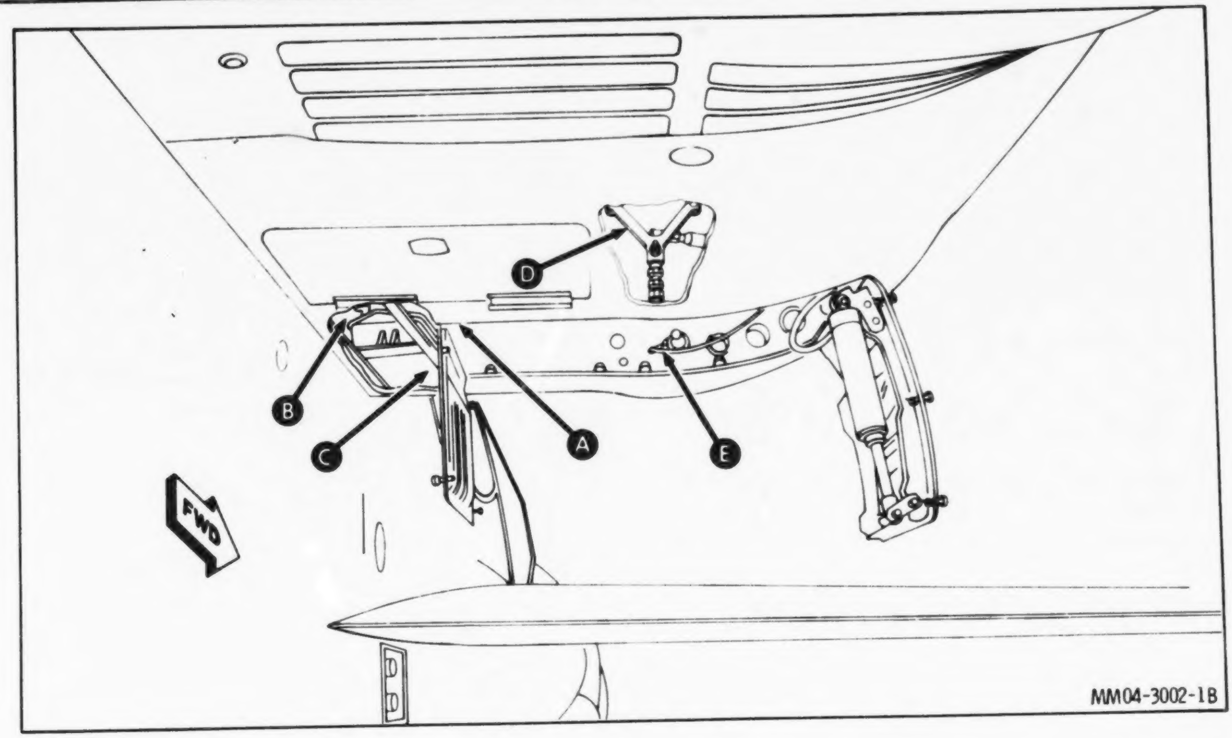
4-2-10. NO. 2 ENGINE REMOVAL - LOWER DISCONNECTION



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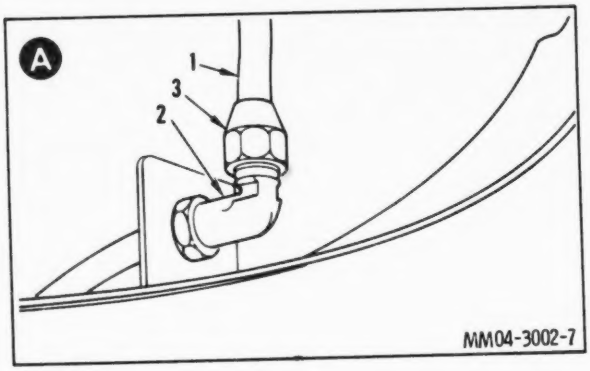
1. **Disconnect bleed hose (1) from elbow fitting (2).** Hold elbow (2). Remove nut (3).



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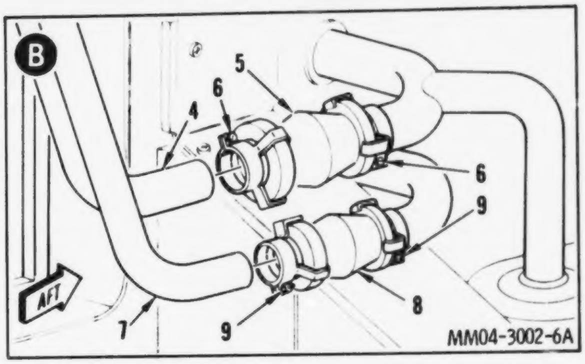
4-2-10. NO. 2 ENGINE REMOVAL - LOWER DISCONNECTION (cont) 4-2-10

2. **Disconnect starter air tube (4) from coupling (5).**

   a. Loosen two clamp screws (6).

   b. Slide coupling (5) until tube (4) is clear.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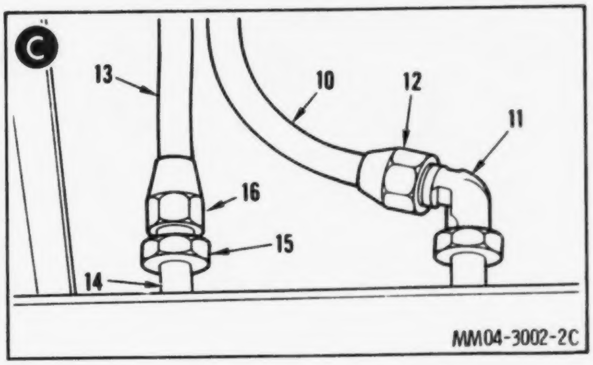
3. **Disconnect bleed air tube (7) from coupling (8).**

   a. Loosen two clamp screws (9).

   b. Slide coupling (8) aft until tube (7) is clear.

4. **Disconnect drain hose (10) from elbow fitting (11).** Hold elbow (11). Remove nut (12).

5. **Disconnect drain tube (13) from fitting (14).** Hold hex (15). Remove nut (16).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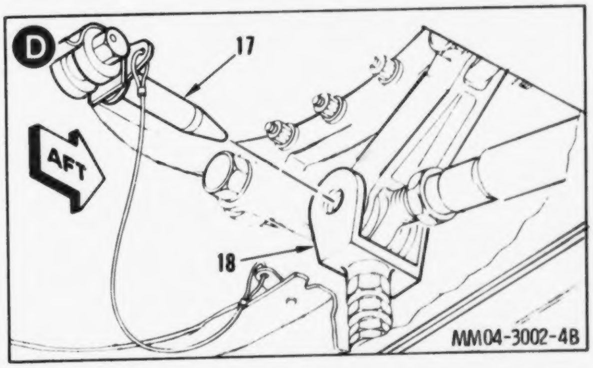
6. **Remove support pin (17) from aft lower engine mount (18).** Unlock pin (17).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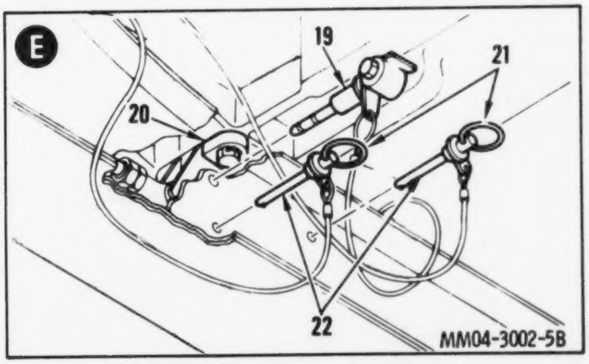
7. **Remove support pin (19) from forward lower engine mount (20).** Push release button (21). Pull pins (22).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4-2-11. NO. 2 ENGINE REMOVAL - REMOVE FROM HELICOPTER

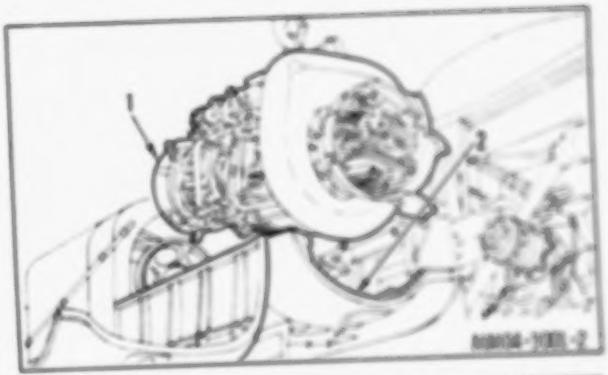
WARNING

Hoisted components, if allowed to fall, can cause injury or death to personnel. Keep away from component mounting surfaces and loaded crane boom. If injury occurs, seek medical aid.

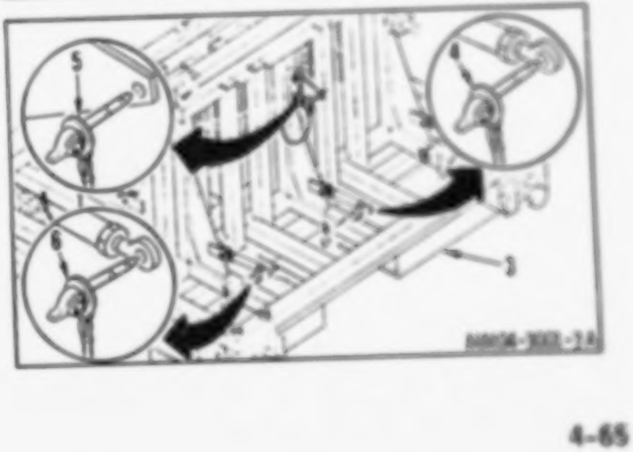
CAUTION

When lifting engine from nacelle, make sure that all hoses, electrical plugs, lines, and cables are clear of obstructions.

1. **Lift engine (1) straight up and out of nacelle (2).** Use aircraft mounted crane.



2. **Prepare engine handling adapter (3).** Remove support pins (4), (5), and (6).



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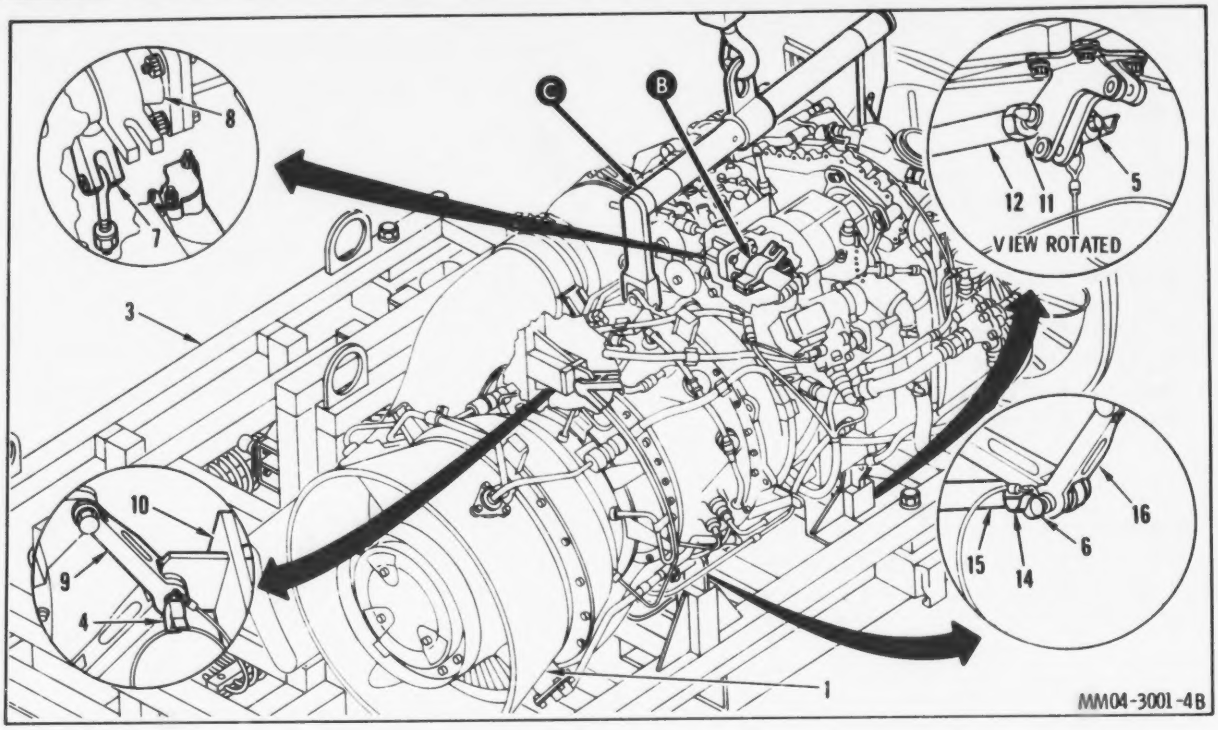
4-2-11. NO. 2 ENGINE REMOVAL - REMOVE FROM HELICOPTER (cont) 4-2-11



3. Install engine (1) on engine handling adapter (3).

   a. Aline forward inboard engine mount (7) with adapter forward inboard support (8).

   b. Aline aft inboard engine mount (9) with adapter aft inboard support (10).

   c. Install support pin (4) through support (10) and mount (9).

   d. Loosen jam nuts (11) on adapter lower forward support (12). Adjust support (11) to aline with engine mount (13).

   e. Install pin (5) through support (12) and engine mount (13).

   f. Loosen jam nuts (14) on adapter aft lower support (15). Adjust support (15) to aline with engine mount (16).

   g. Install pin (6) through support (15) and mount (16).

   h. Lock support pins (4), (5), and (6).

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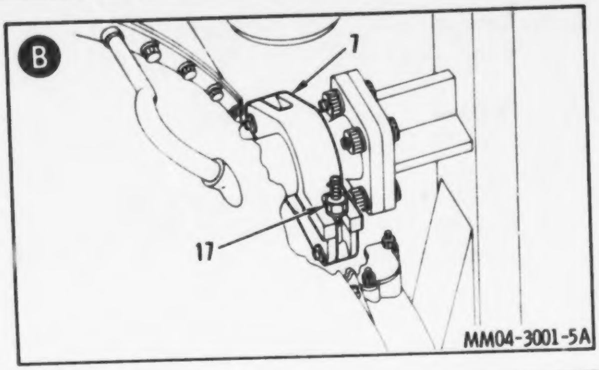
4-2-11. NO. 2 ENGINE REMOVAL - REMOVE FROM HELICOPTER (cont)

i. Close forward inboard mount (7).

j. Tighten clamp nut (17).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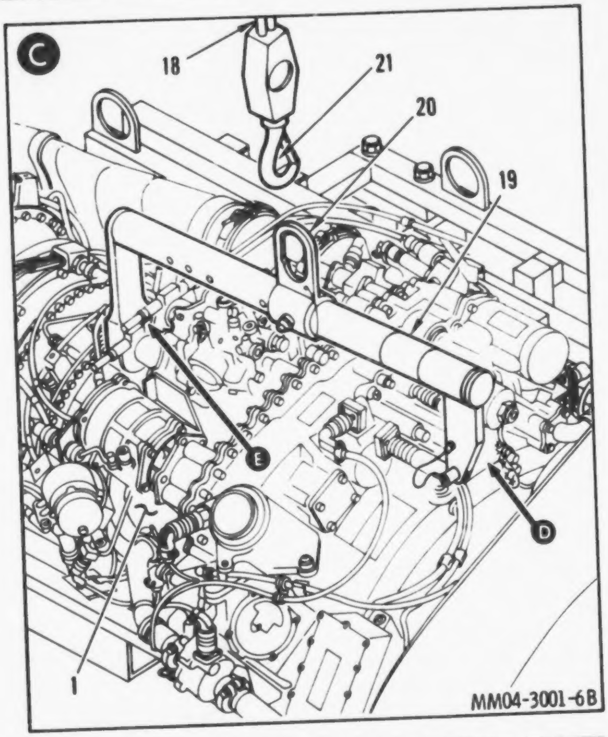
4. **Release tension on lifting cable (18).** Use aircraft mounted crane.

5. **Remove sling (19) from engine (1).**

   a. Remove hook (20) from lifting eye (21).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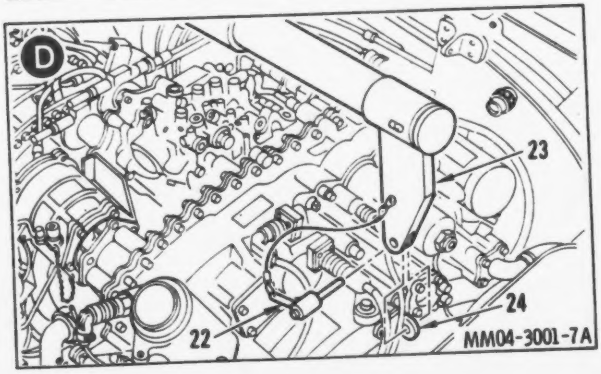
   b. Remove pin (22) from forward hanger link (23) and lifting lug (24).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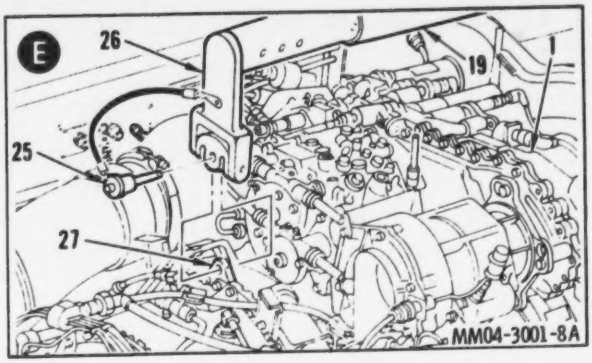
4-2-11. NO. 2 ENGINE REMOVAL - REMOVE FROM HELICOPTER (cont) 4-2-11

c. Remove pin (25) from aft hanger link (26) and lifting lug (27).

d. Remove sling (19) from engine (1).

e. Check all airframe mounts of engine (1) for defects and loose mounting.



END OF TASK

4-2-12. NO. 1 OR NO. 2 AFT ENGINE MOUNT SUPPORT REPLACEMENT

This task covers: A. REMOVAL B. INSPECTION C. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Equipment Conditions:

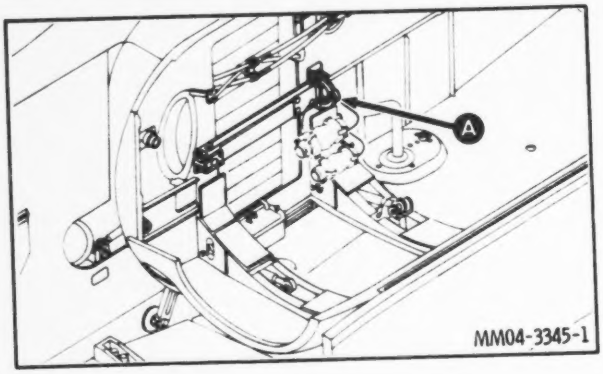
Ref	Condition
1-7-2	Helicopter safed
4-2-5	Left engine supported or
4-2-8	Right engine supported
4-4-12	No 2 engine air duct removed

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

NOTE

This task is typical for left or right aft engine mount support.



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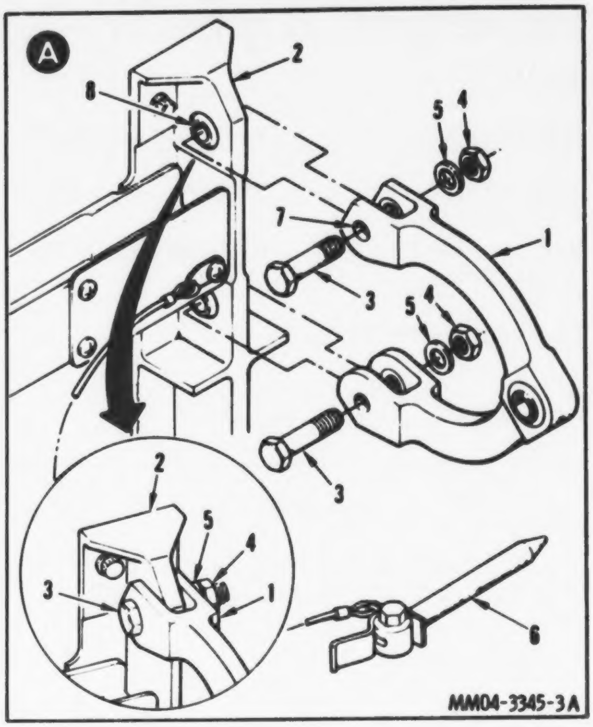
4-2-12. NO. 1 OR NO. 2 AFT ENGINE MOUNT SUPPORT REPLACEMENT (cont) 4-2-12



A. REMOVAL

1. **Remove aft engine mount support (1) from nacelle (2).**
   - a. Hold two bolts (3).
   - b. Remove two nuts (4) and washers (5).
   - c. Remove two bolts (3).
   - d. Remove mount (1).

B. INSPECTION

1. **Check engine support pin for cracks.** None allowed.
2. **Check pin for corrosion** (para 1-5-38).

C. INSTALLATION

1. **Install mount (1) to nacelle (2).**
   - a. Aline holes (7) of mount (1) with holes (8) on nacelle (2).
   - b. Install two bolts (3) through mount (1) and nacelle (2).
   - c. Install two washers (5) and nuts (4).
2. **Torque two nuts to 75 INCH-POUNDS.**
   - a. Hold bolt (3).
   - b. Torque two nuts (4) to **75 INCH-POUNDS.**
3. **Inspect (TI).**
4. **Reconnect engine** (left para 4-2-5, or right para 4-2-8).
5. **Install No. 2 transmission duct** (para 4-2-7).

END OF TASK

4-2-13. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE 4-2-13

This task covers the following paragraphs for removal of accessory items to prepare engine for shipment. Paragraphs are in proper sequence of removal and may be used for No. 1 and/or No. 2 engine. All serviceable items shall be retained for installation on new engine (para 4-2-27).

4-2-14. No. 1 and No. 2 Engine Air Duct
4-2-15. No. 1 and No. 2 Engine Air Inlet Removal
4-2-16. No. 1 and No. 2 Engine Fuel Inlet Hose Removal
4-2-17. No. 1 Engine Wiring Removal
4-2-18. No. 2 Engine Wiring Removal
4-2-19. No. 1 Engine Starter and Regulating Valve Removal
4-2-20. No. 2 Engine Starter and Regulating Valve Removal
4-2-21. No. 1 Engine Anti-Ice and Bleed Air System Removal
4-2-22. No. 2 Engine Anti-Ice and Bleed Air System Removal
4-2-23. No. 1 and No. 2 Engine Baseplate and Gearbox Removal
4-2-24. No. 1 and No. 2 Engine Shroud Support Removal
4-2-25. No. 1 and No. 2 Engine Drain System Removal
4-2-26. No. 1 and No. 2 Engine Removal from Handling Adapter
4-2-27. No. 1 and No. 2 Engine Mount Removal

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Kit, Aircraft Adapter	1730-01-240-6743
Sling, Engine	4920-01-108-3484
Crane, Aircraft Mounted	1730-01-103-3106
Wrench, 1 & 1-1/8 Open-end	5120-00-187-7133

Personnel Required:

67R10	Aircraft Helicopter Repairer (2) One to assist

References:

TM 55-1500-204-25/1
TM 55-2840-248-23

Equipment Conditions:

Ref	Condition
6-4-15	Nose gearbox and quill shaft removed

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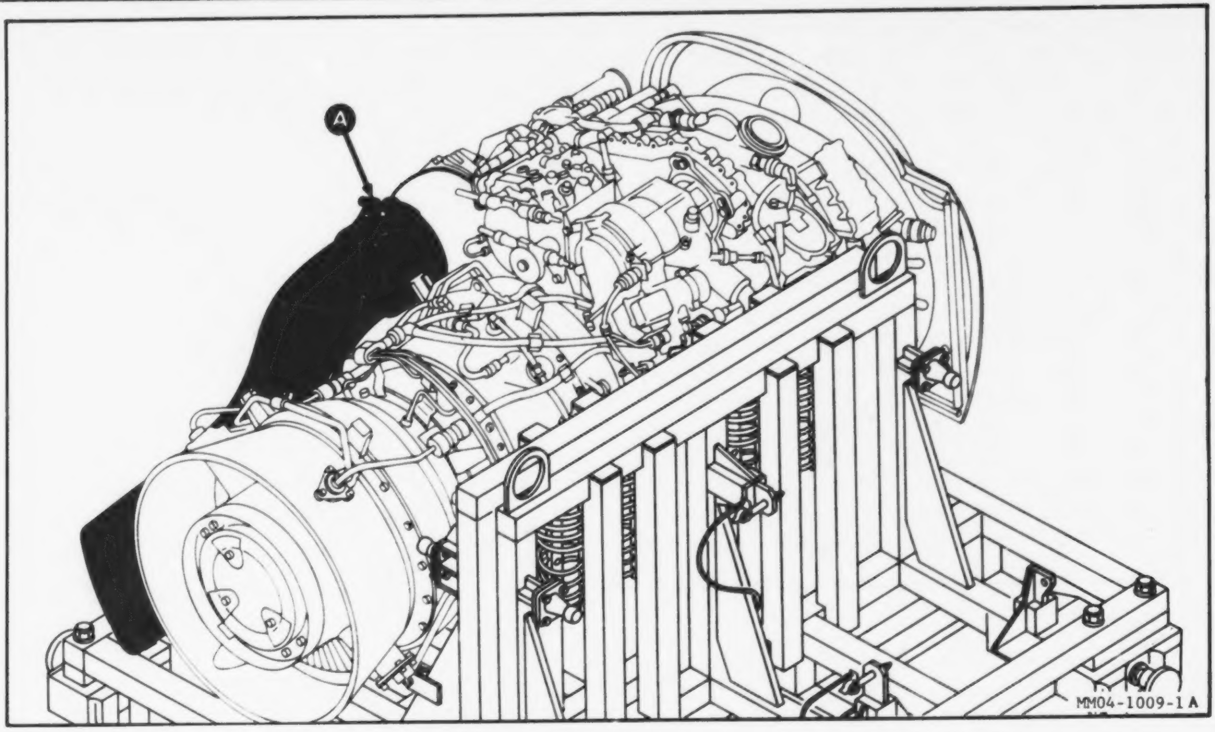
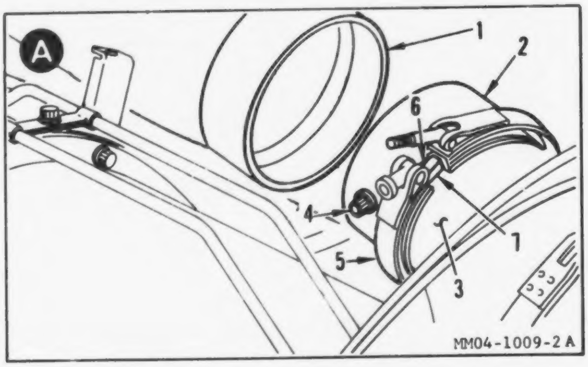
4-2-14. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE AIR DUCT REMOVAL 4-2-14





NOTE

This task is typical for No. 1 or No. 2 engine air duct.

1. **Remove air duct (1).** Slide air duct (1) aft to clear adapter flange (2). Remove duct (1) from engine.

2. **Disconnect flange (2) from inlet particle separator blower (3).**

   a. Remove nut (4).

   b. Open rim clenching clamp (5). Remove clamp (5) from mounting flanges (6) and (7).

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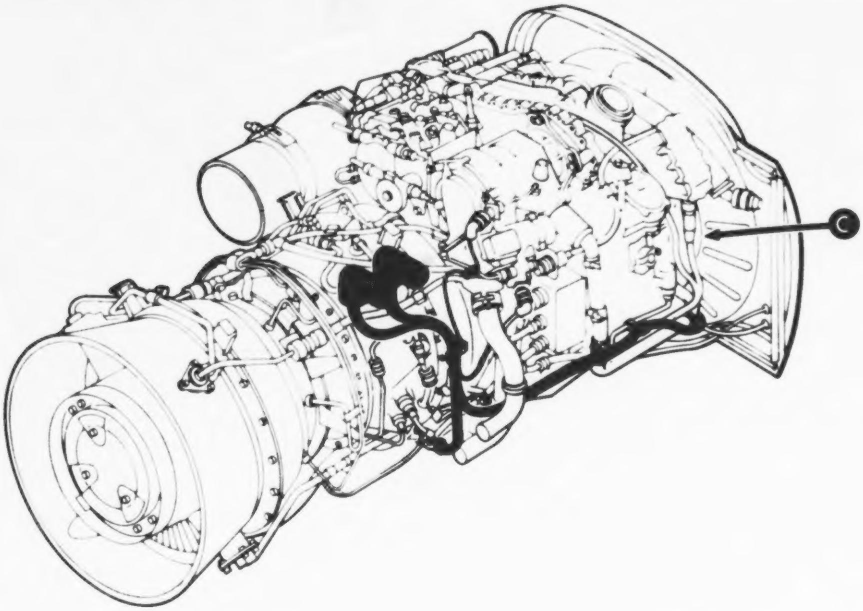
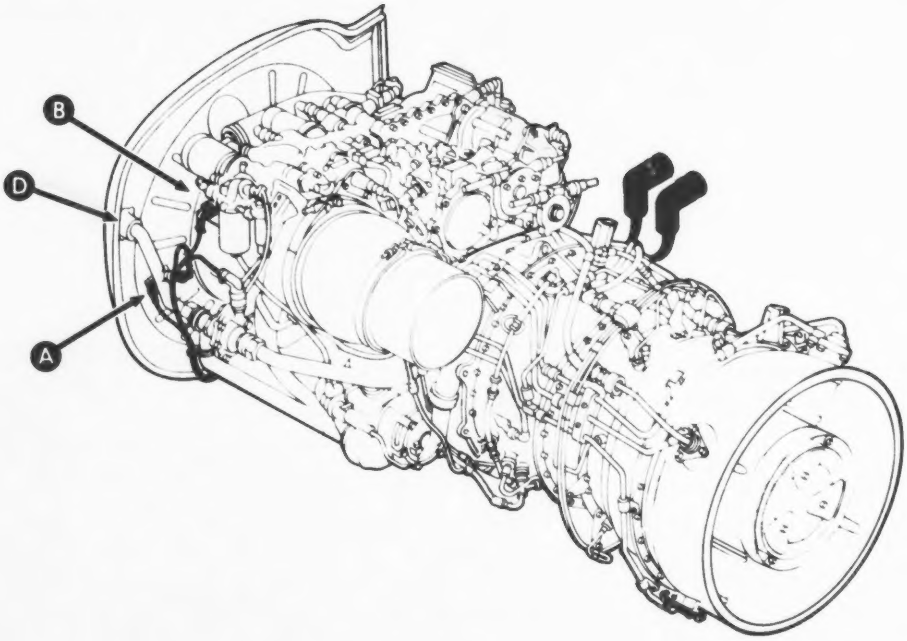
4-2-15. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE AIR INLET REMOVAL





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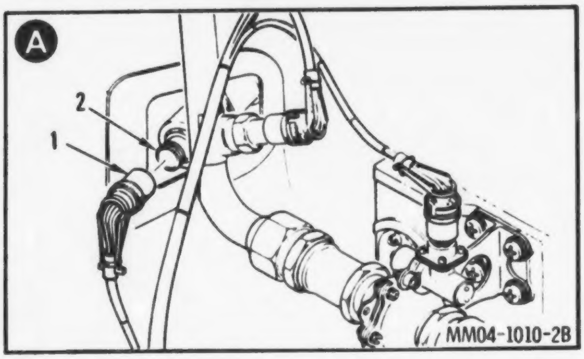
4-2-15. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE AIR INLET REMOVAL (cont) 4-2-15

NOTE

This task is typical for No. 1 or No. 2 engine air inlet.

1. **Detach connector P25 (1) from connector A31J1 (2).**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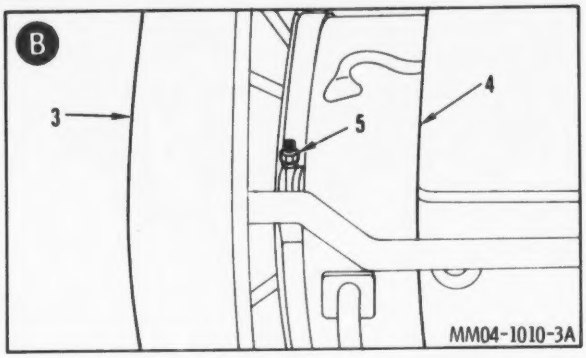
2. **Remove air inlet (3) from engine inlet (4).**

   a. Loosen nut (5).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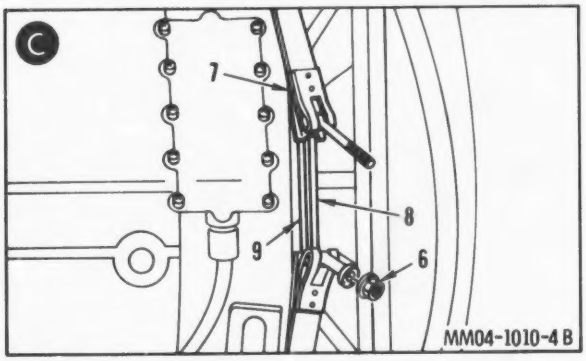
   b. Remove nut (6).

   c. Open coupling (7). Remove coupling (7) from flanges (8) and (9).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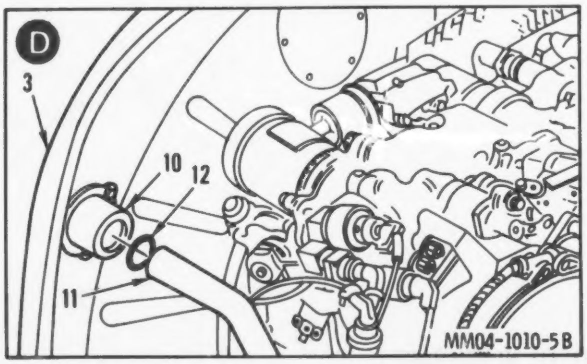
   d. Pull air inlet (3) forward until support (10) is clear of anti-ice tube (11).

   e. Remove and discard seal (12).

   f. Check air tube (11) for holes, cracks, or dents (para 4-2-2).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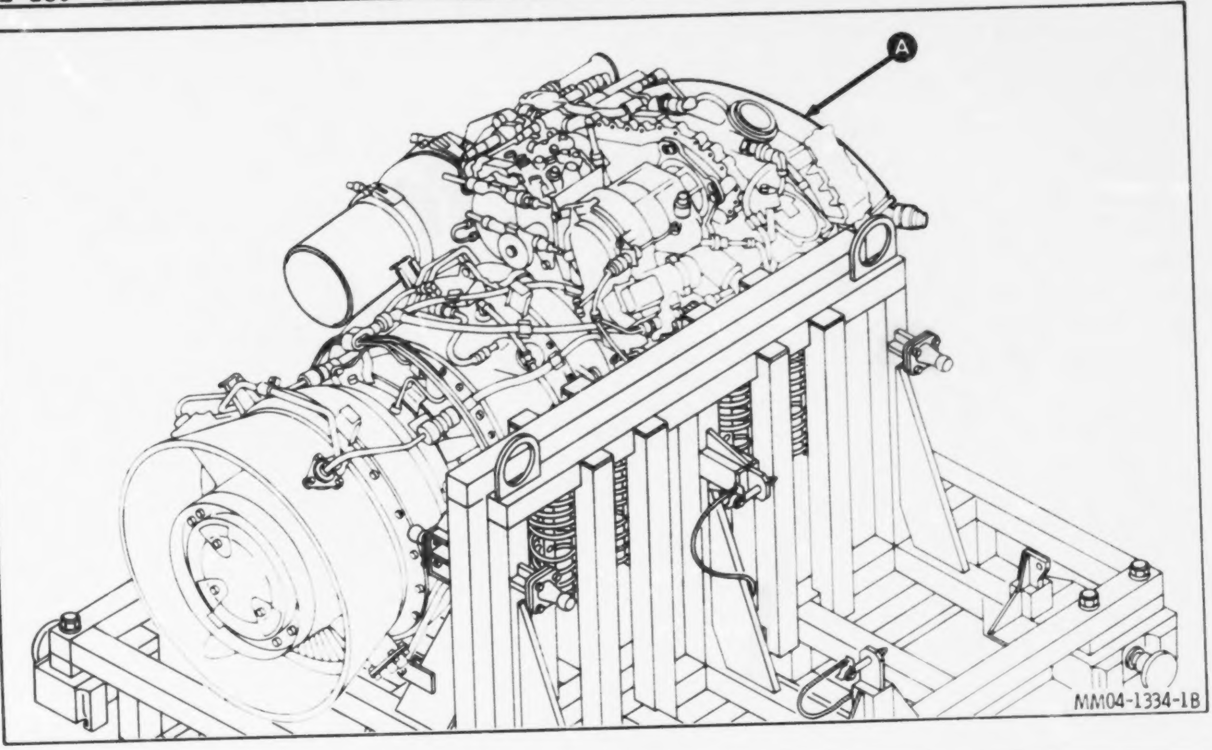
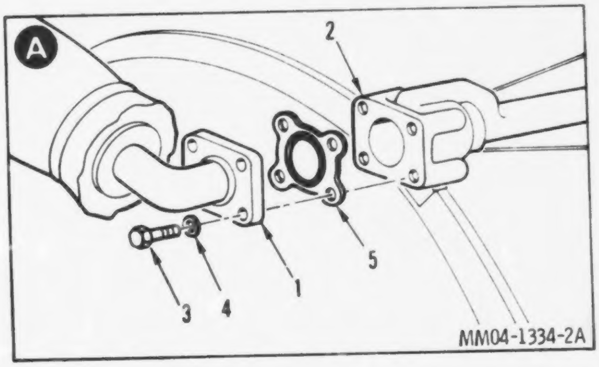
4-2-16. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE FUEL INLET HOSE REMOVAL 4-2-16





NOTE

This task is typical for No. 1 or No. 2 engine fuel inlet hose.

1. **Remove fuel inlet hose (1) from fuel boost pump (2).**
   - a. Remove four bolts (3) and washers (4).
   - b. Remove and discard seal (5).
   - c. Check fuel inlet hose (1) and pump (2) for leakage, abrasion, kinks, or cracks. None allowed.

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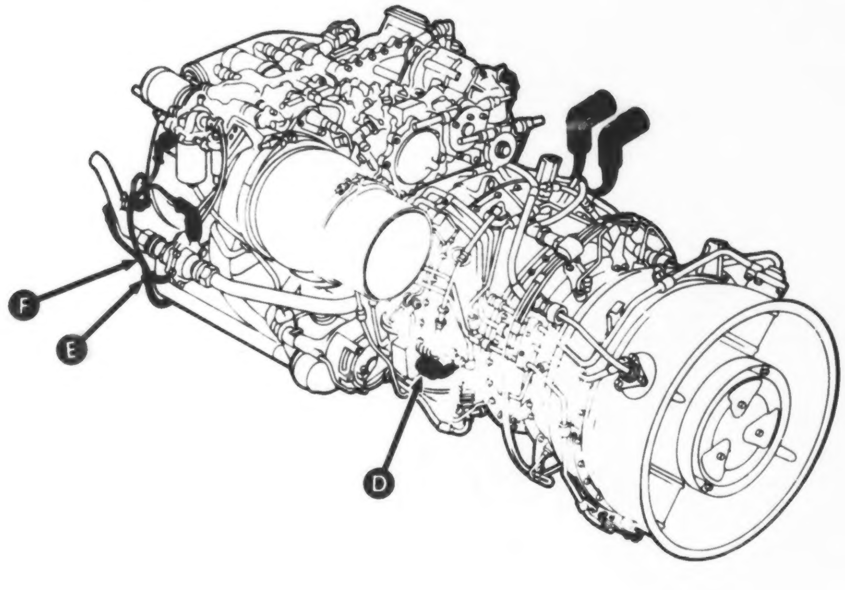
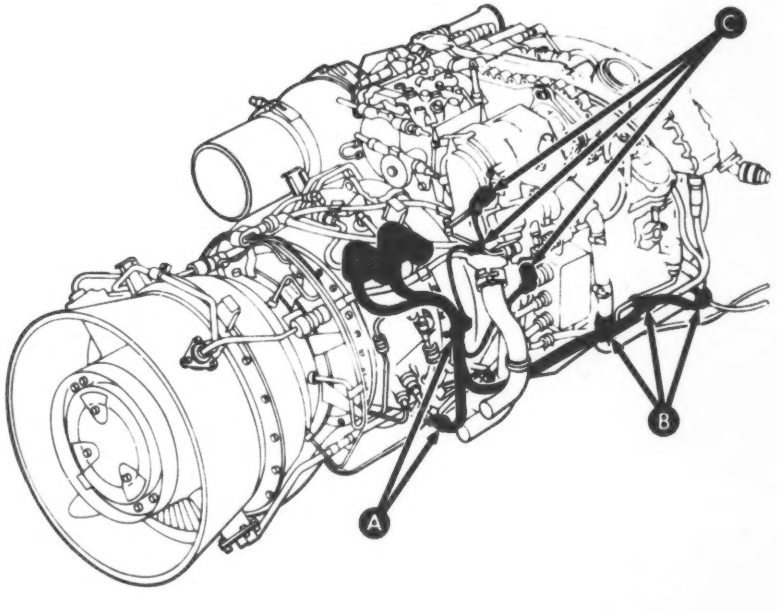
4-2-17. ENGINE TEARDOWN - NO. 1 ENGINE WIRING REMOVAL 4-2-17





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4-2-17. ENGINE TEARDOWN - NO. 1 ENGINE WIRING REMOVAL (cont) 4-2-17

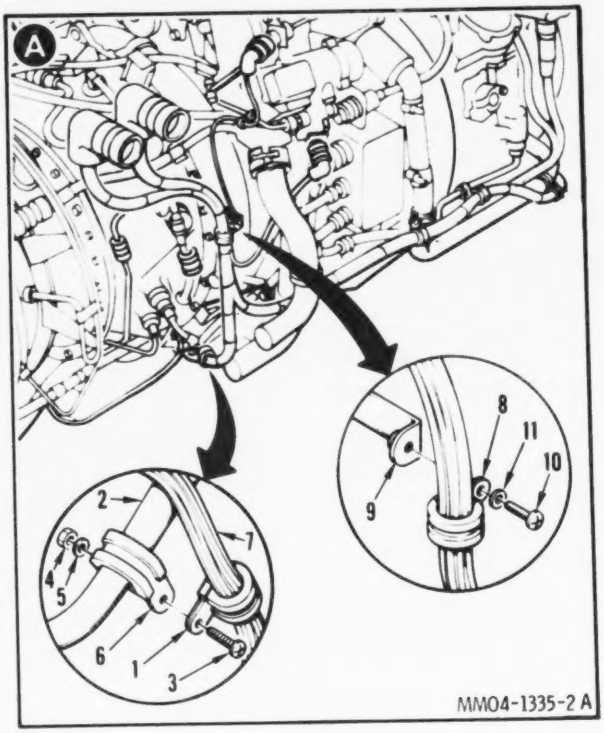
1. **Remove wire harness support clamp (1) from C-sump seal pressure tube (2).**

   a. Hold screw (3). Remove nut (4) and washer (5).

   b. Remove screw (3) from clamps (1) and (6).

   c. Remove clamp (1) from harness (7).

2. **Remove wire harness support clamp (8) from engine clip (9).** Remove screw (10) washer (11), and clamp (8) from engine clip (9).



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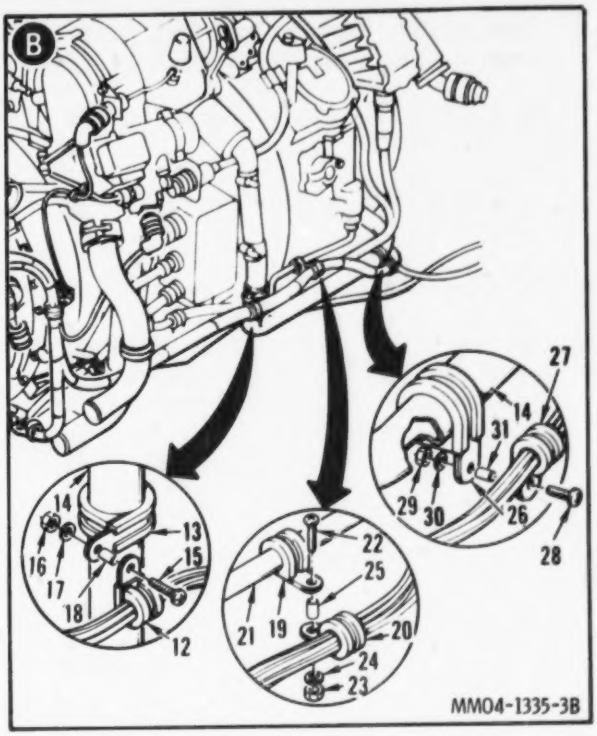
4-2-17. ENGINE TEARDOWN - NO. 1 ENGINE WIRING REMOVAL (cont) 4-2-17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3. **Remove wire harness support clamps (12) and (13) from sensing tube (14).**

   a. Hold screw (15). Remove nut (16) and washer (17).

   b. Remove screw (15) from clamp (12), spacer (18), and clamp (13).

4. **Remove wire harness support clamps (19) and (20) from drain manifold (21).**

   a. Hold screw (22). Remove nut (23) and washer (24).

   b. Remove screw (22) from clamp (19), spacer (25) and clamp (20).

5. **Remove wire harness support clamps (26) and (27) from sensing tube (14).**

   a. Hold screw (28). Remove nut (29) and washer (30).

   b. Remove screw (28) from clamp (26), spacer (31), and clamp (27).

GO TO NEXT PAGE

4-2-17. ENGINE TEARDOWN - NO. 1 ENGINE WIRING REMOVAL (cont) 4-2-17

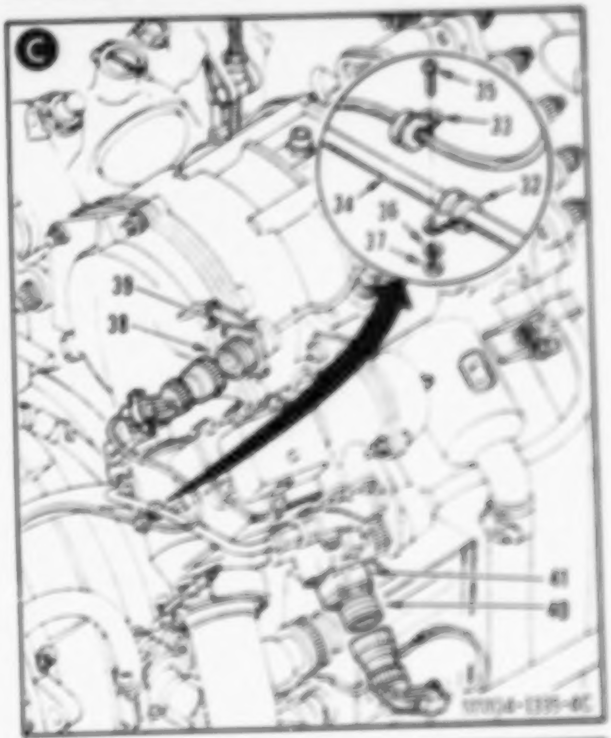
6. Remove wire harness support clamps (32) and (33) from engine regulator valve tube (34).

   a. Hold screw (35). Remove nut (37) and washer (36).

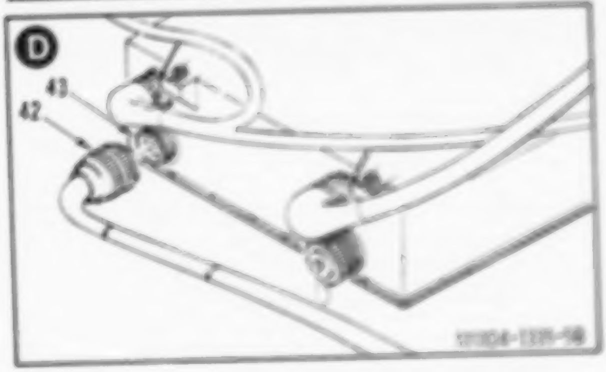
   b. Remove screw (35) from clamps (32) and (33).

7. Detach connector P35 (38) from starter connector A3 (39).

8. Detach connector P39 (40) from starter regulator valve connector L3 (41).



9. Detach connector P41 (42) from electrical control unit connector E1 (43).



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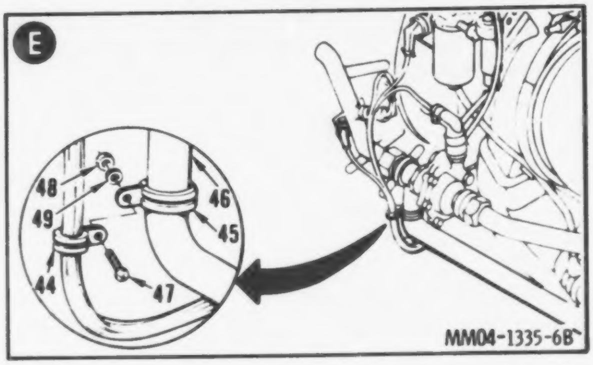
4-2-17. ENGINE TEARDOWN - NO. 1 ENGINE WIRING REMOVAL (cont) 4-2-17

10. **Remove wire harness support clamps (44) and (45) from bleed duct (46).**

    a. Hold screw (47). Remove nut (48) and washer (49).

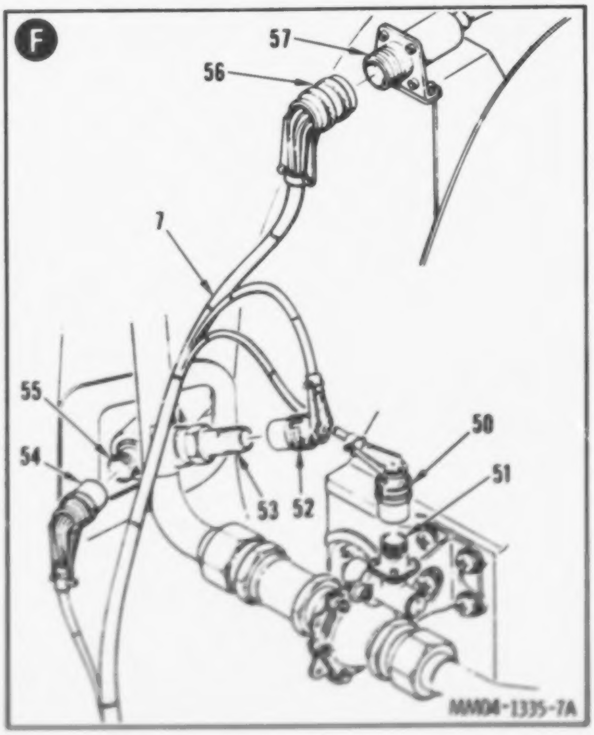
    b. Remove screw (47) from clamps (44) and (45).



11. **Detach connector P33 (50) from anti-ice valve connector L1 (51).**

12. **Detach connector P954 (52) from temperature switch S127 (53).**

13. **Detach connector P25 (54) from ice detector connector J1 (55).**



14. **Detach connector P45 (56) from connector E3 (57).**

15. **Remove wire harness (7) from No. 1 engine.**

16. **Check wire harness for evidence of:**

    a. Broken, bent, or burned pins (TM 55-2840-248-23).

    b. Worn, chafed, or burned wiring (TM 55-2840-248-23).

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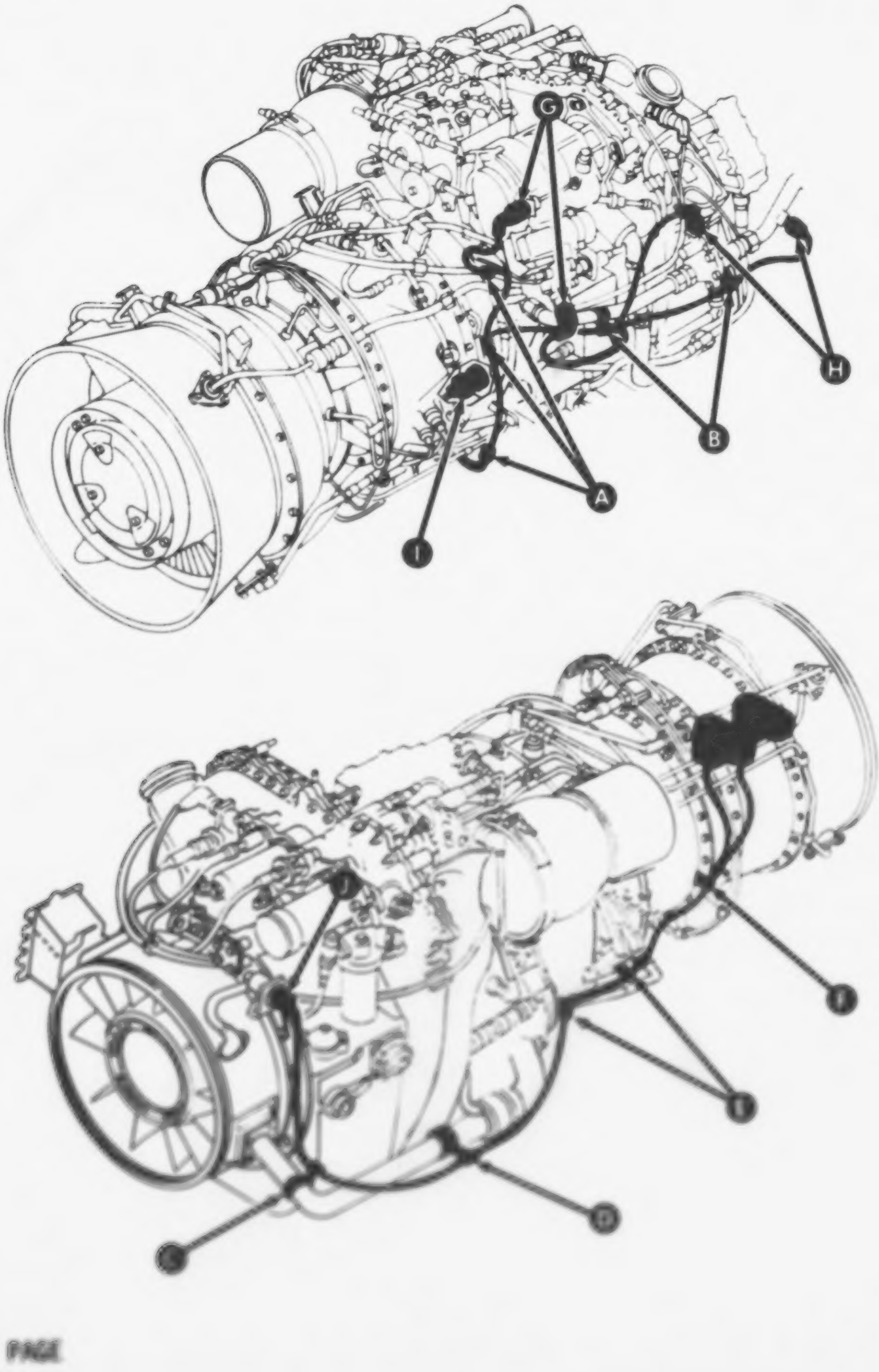
4-2-18. ENGINE TEARDOWN - NO. 2 ENGINE WIRING REMOVAL 4-2-18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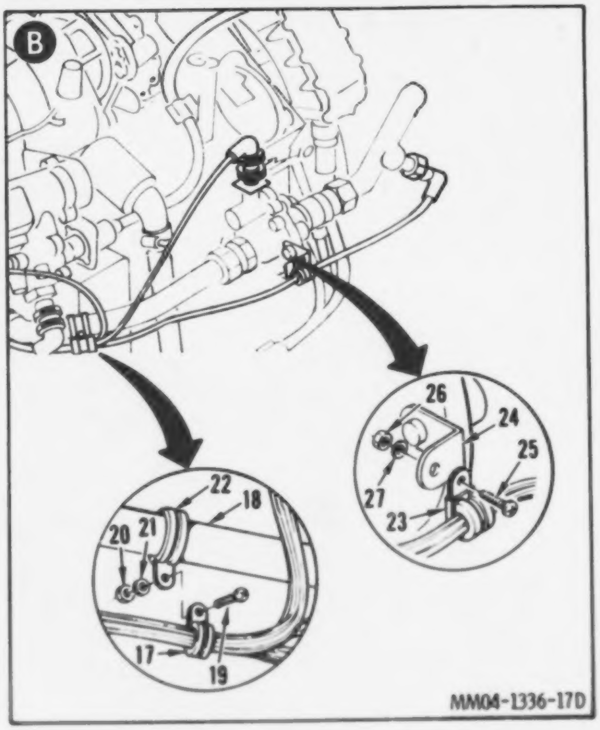
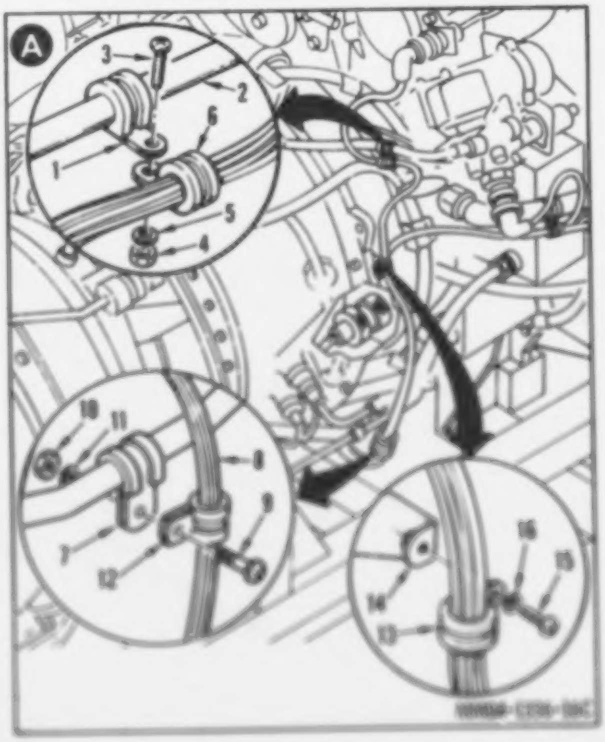
4-2-18. ENGINE TEARDOWN - NO. 2 ENGINE WIRING REMOVAL (cont) 4-2-18

1. **Remove wire harness support clamp (1) from engine regulator valve tube (2).**
   a. Hold screw (3). Remove nut (4) and washer (5).
   b. Remove screw (3) from clamps (1) and (6).
2. **Remove wire harness support clamp (7) from overspeed sensor tube (8).**
   a. Hold screw (9). Remove nut (10) and washer (11).
   b. Remove screw (9) from clamps (7) and (12).
3. **Remove wire harness support clamp (13) from engine clip (14).** Remove screw (15), washer (16), and clamp (13) from clip (14).



4. **Remove wire harness support clamp (17) from anti-ice tube (18).**
   a. Hold screw (19). Remove nut (20) and washer (21).
   b. Remove screw (19) from clamps (17) and (22).
5. **Remove wire harness support clamp (23) from anti-ice valve clip (24).**
   a. Hold screw (25). Remove nut (26) and washer (27).
   b. Remove screw (25) from clamp (23) and clip (24).



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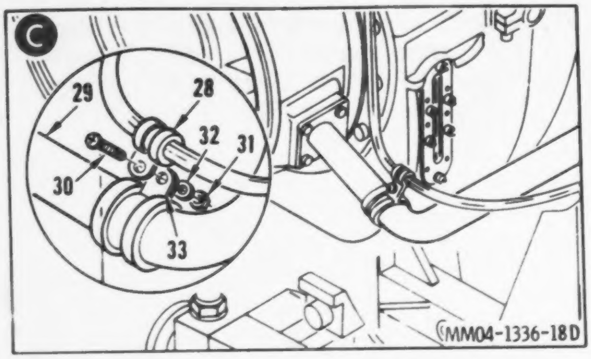
4-2-18. ENGINE TEARDOWN - NO. 2 ENGINE WIRING REMOVAL (cont) 4-2-18

6. **Remove wire harness support clamp (28) from anti-ice tube (29).**

   a. Hold screw (30). Remove nut (31) and washer (32).

   b. Remove screw (30) from clamps (28) and (33).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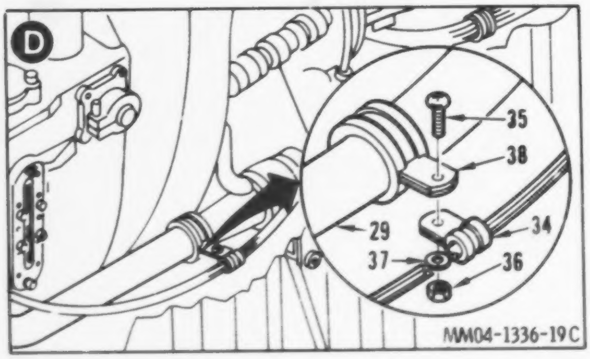
MM04-1336-18D

7. **Remove wire harness support clamp (34) from anti-ice tube (29).**

   a. Hold screw (35). remove nut (36) and washer (37).

   b. Remove screw (35) from clamps (34) and (38).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8. **Remove wire harness support clamp (39) from drain manfold (40).**

   a. Hold screw (41). Remove nut (42) and washer (43).

   b. Remove screw (41) from clamps (39) and (44).

9. **Remove wire harness support clamp (45) from manifold (40).**

   a. Hold screw (46). Remove nut (47) and washer (48).

   b. Remove screw (46) from clamp (49), spacer (50), and clamp (45).

10. **Remove wire harnes support clamp (51) from engine cip (52). Remove screw (53) from waher (54), clamp (51), and clip (52.**

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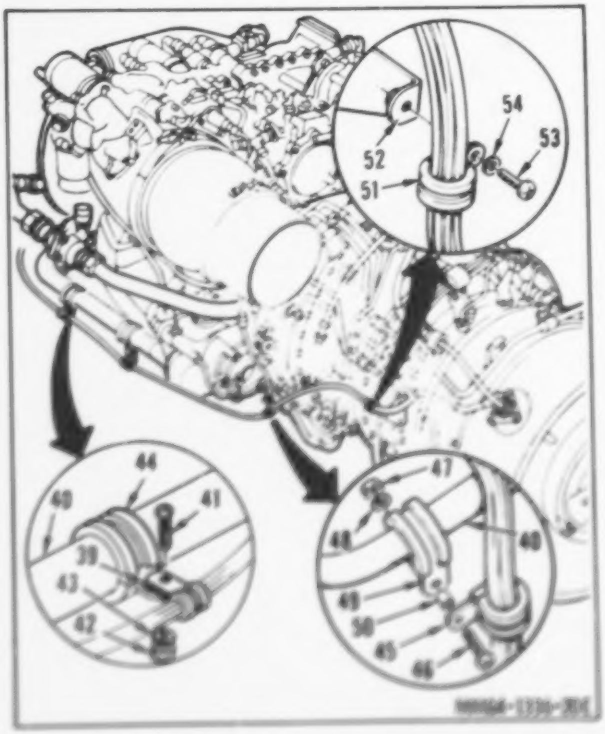
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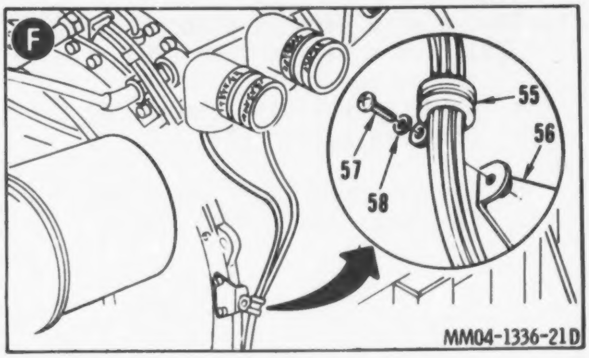
4-2-18. ENGINE TEARDOWN - NO. 2 ENGINE WIRING REMOVAL (cont) 4-2-18

11. Remove wire harness support clamp (55) from engine clip (56). Remove screw (57) from clamp (55), washer (58), and clip (56).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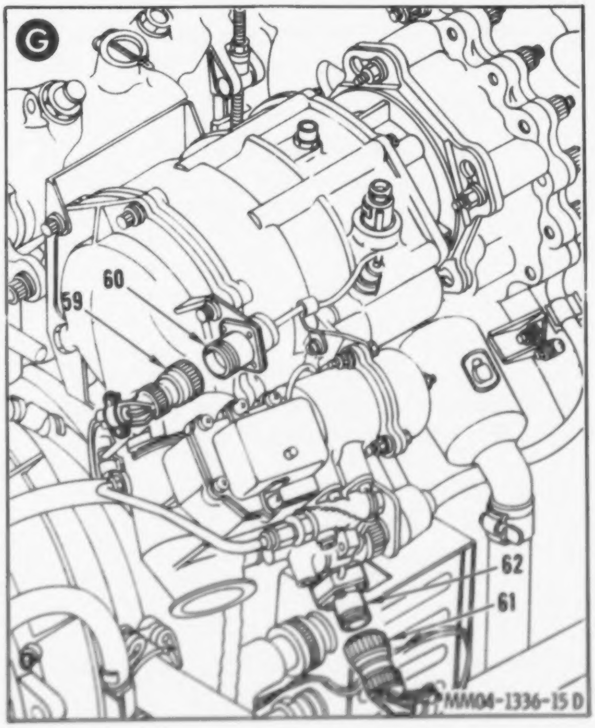
MM04-1336-21D

12. Detach connector P36 (59) from engine starter connector A4 (60).
13. Detach connector P40 (61) from engine starter regulator valve connector L4 (62).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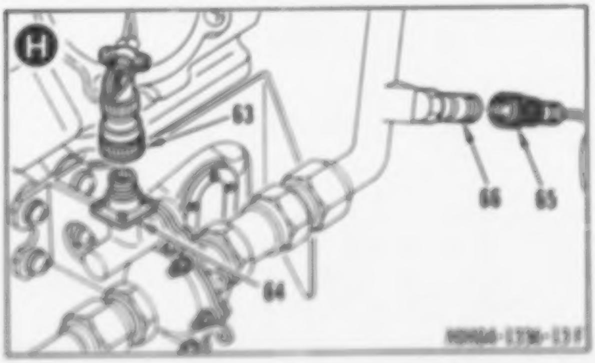
MM04-1336-15 D

14. Detach connector P34 (63) from anti-ice valve connector L2 (64).
15. Detach connector P953 (65) from temperature switch connector S126 (66).



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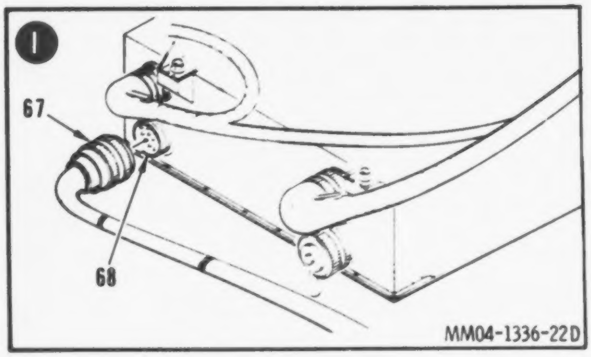
4-2-18. ENGINE TEARDOWN - NO. 2 ENGINE WIRING REMOVAL (cont) 4-2-18

16. Detach connector P42 (67) from electrical control unit connector E1 (68).



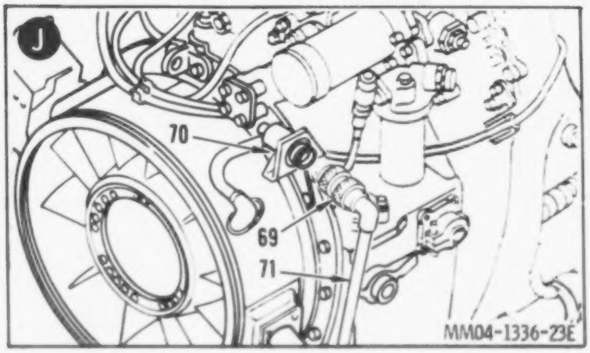
17. Detach connector P46 (69) from airframe monitoring connector E3 (70).

18. Remove wire harness assembly (71) from No. 2 engine.

19. Check wire harness (71) for:

    a. Broken, bent, or burned pins (TM 55-2840-248-23).

    b. Worn, chafed, or burned wiring (TM 55-2840-248-23).



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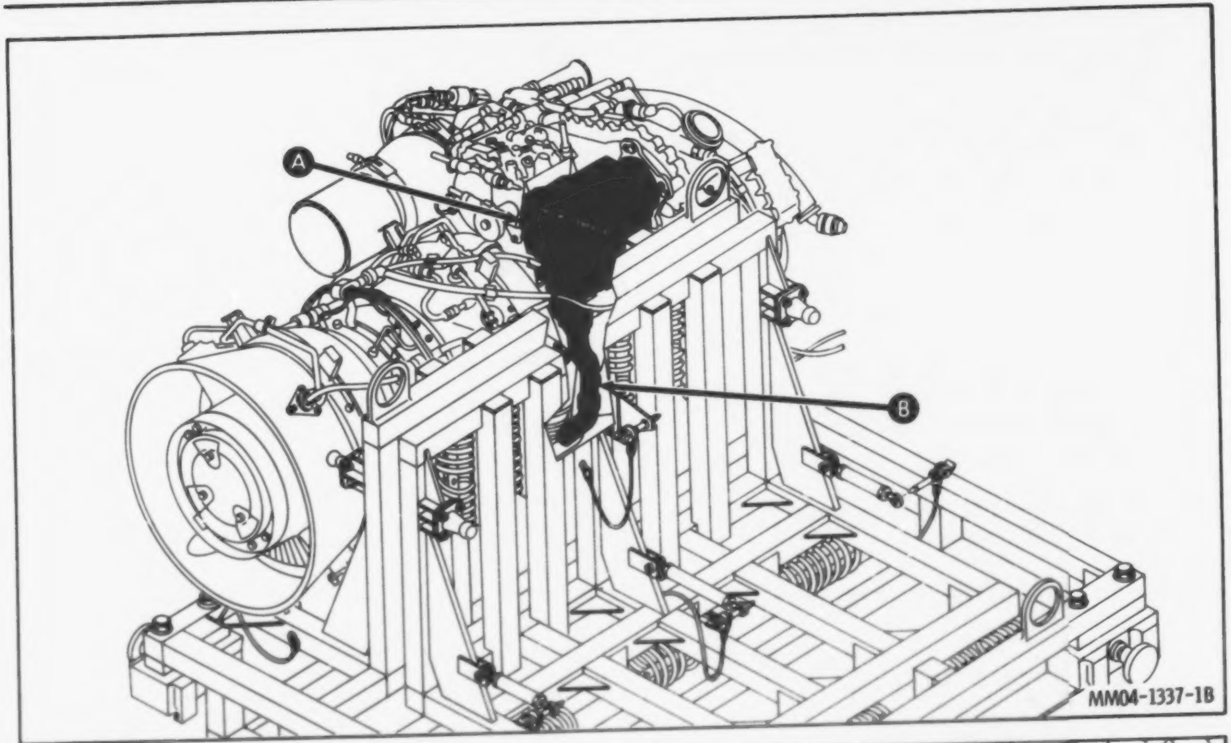
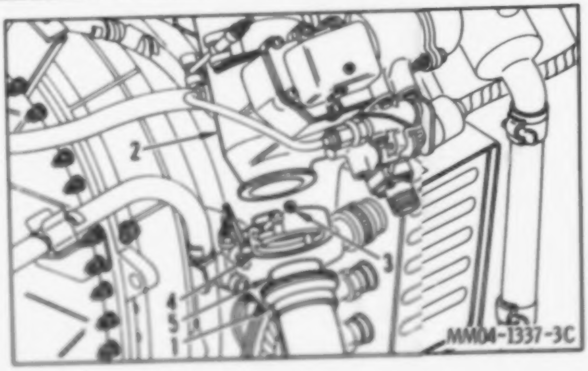
4-2-19. ENGINE TEARDOWN - NO. 1 ENGINE AIR STARTER AND REGULATING VALVE REMOVAL





1. **Remove starter air tube (1) from regulator valve (2).**

   a. Remove nut (3) from coupling (4).

   b. Remove coupling (4) from air starter tube (1) and regulator valve (2).

   c. Remove insert (5) from air starter tube (1).

   d. Check air tube (1) for holes or dents (para 4-2-2).

GO TO NEXT PAGE

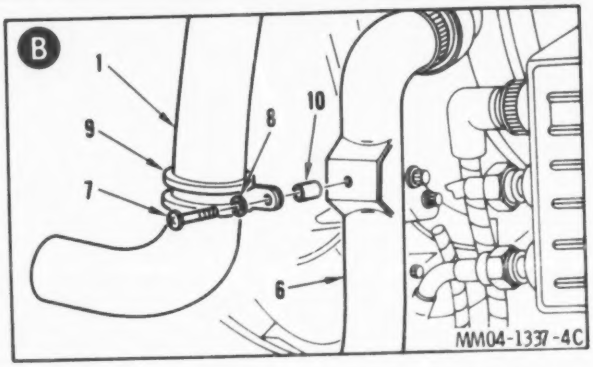
4-2-19. ENGINE TEARDOWN - NO. 1 ENGINE AIR STARTER AND REGULATING VALVE REMOVAL (cont)

2. **Remove starter air tube (1) from bleed air tube (6).**

   a. Remove screw (7) and washer (8).

   b. Remove clamp (9) and spacer (10) from bleed air tube (6).

   c. Check air tube (1) for evidence of holes, kinks, or abrasions (para 4-2-2).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MM04-1337-4C

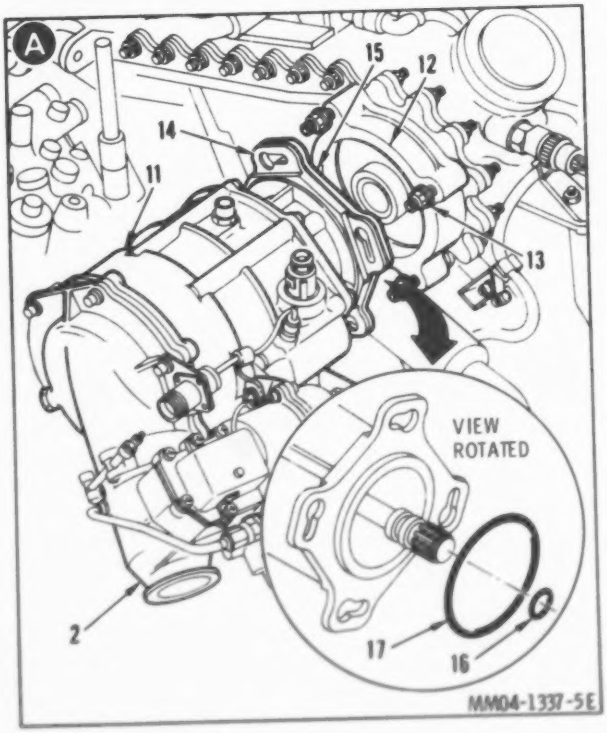
3. **Remove starter (11) with regulator valve (2) from mounting pad (12).**

   a. Loosen four nuts (13). Do not remove nuts.

   b. Turn starter (11) clockwise until nuts (13) aline with slots (14) on starter flange (15).

   c. Pull starter (11) aft until clear of nuts.

   d. Remove and discard packings (16) and (17).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MM04-1337-5E

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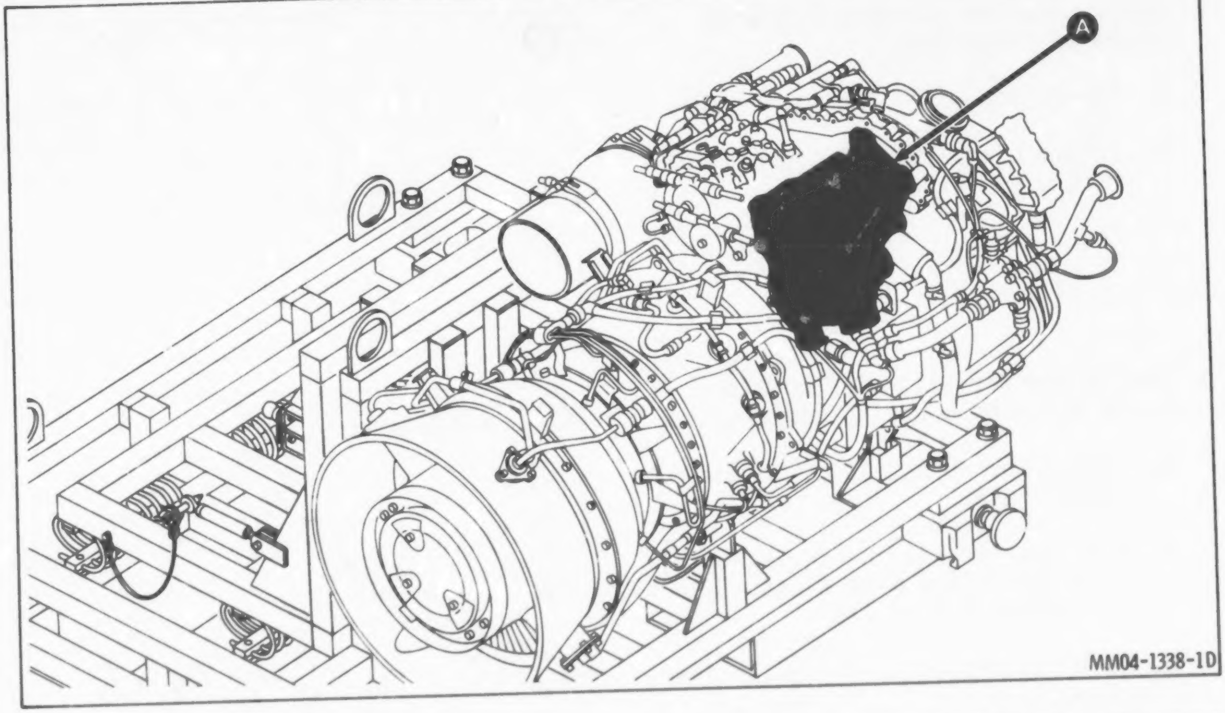
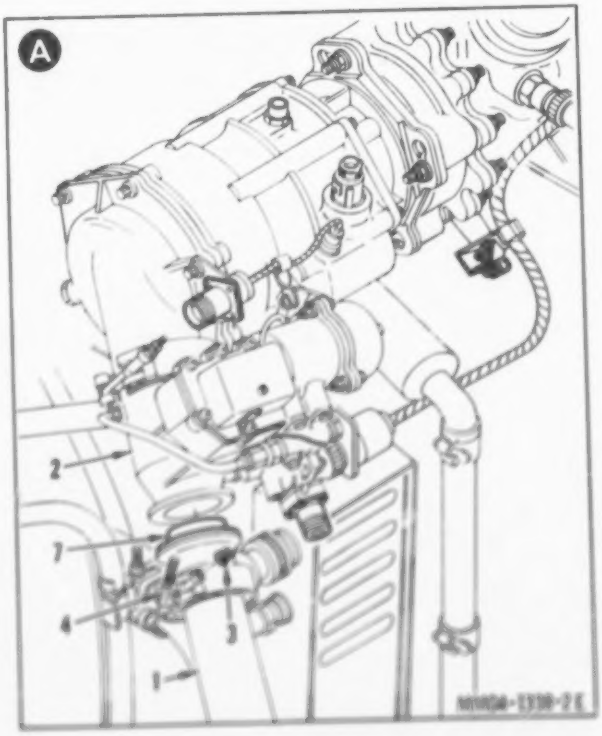
4-2-20. ENGINE TEARDOWN - NO. 2 ENGINE AIR STARTER AND REGULATING VALVE REMOVAL





1. **Remove starter air tube (1) from regulator valve (2).**
    a. Remove nut (3) from coupling (4).
    b. Remove coupling (4) from starter air tube (1) and regulator valve (2).
    c. Remove insert (7) from starter air tube (1) and regulator valve (2).
    d. Check air tube (1) for holes or dents (para 4-2-2).

GO TO NEXT PAGE

4-2-20. ENGINE TEARDOWN - NO. 2 ENGINE AIR STARTER AND REGULATING VALVE REMOVAL (cont) 4-2-20

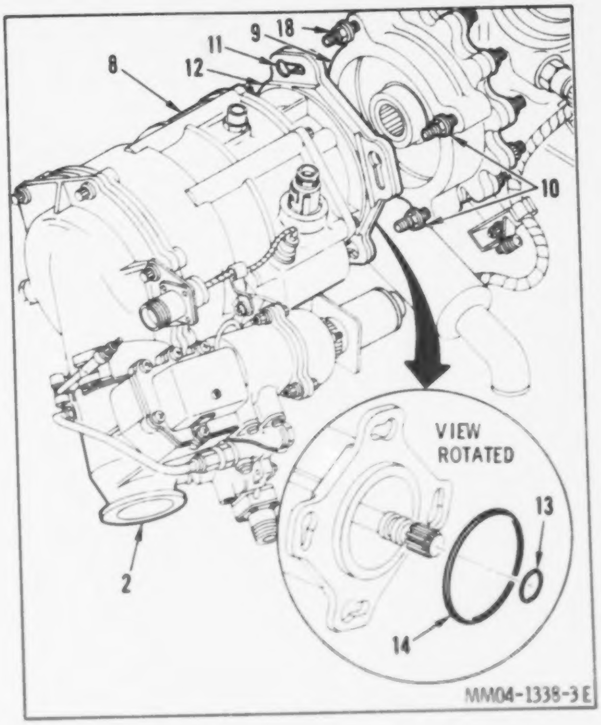
2. Remove starter (8) with valve (2) from mounting pad (9).

a. Loosen four nuts (10). Do not remove nuts.

b. Turn starter (8) clockwise until nuts (10) aline with slots (11) on starter flange (12).

c. Pull starter (8) aft until clear of nuts (10).

d. Remove and discard packings (13) and (14).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MM04-1338-3 E

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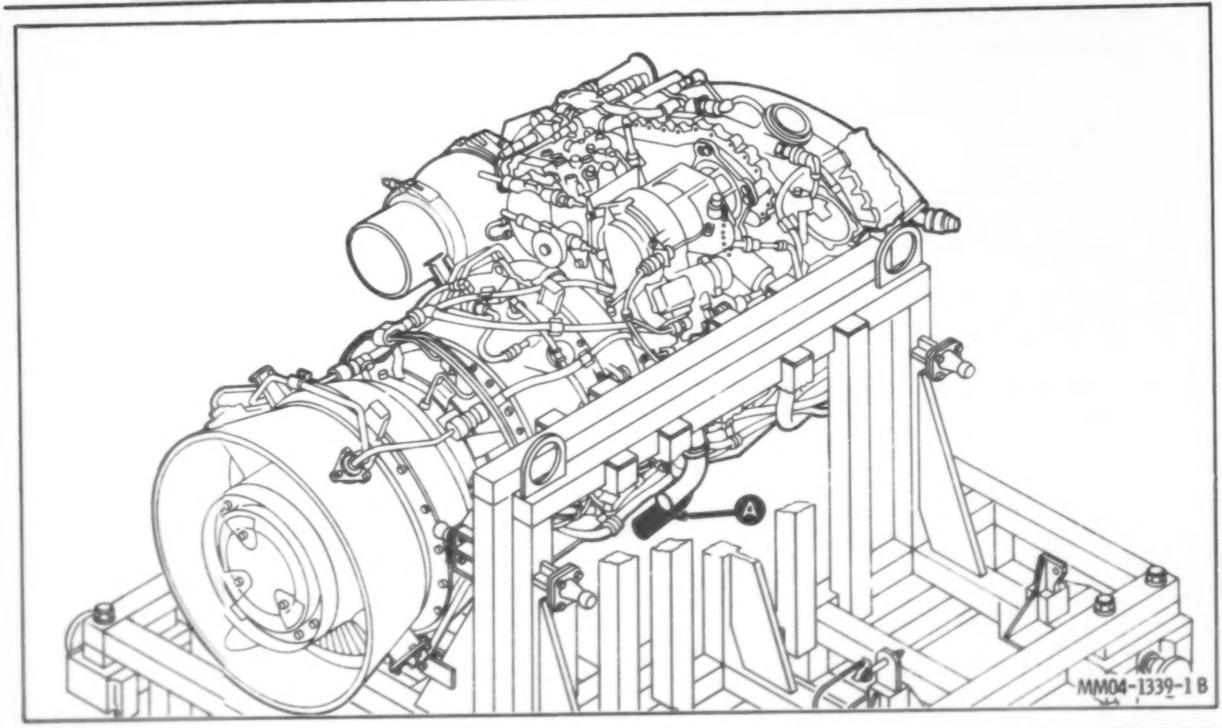
4-2-21. ENGINE TEARDOWN - NO. 1 ENGINE ANTI-ICE AND BLEED AIR SYSTEM REMOVAL 4-2-21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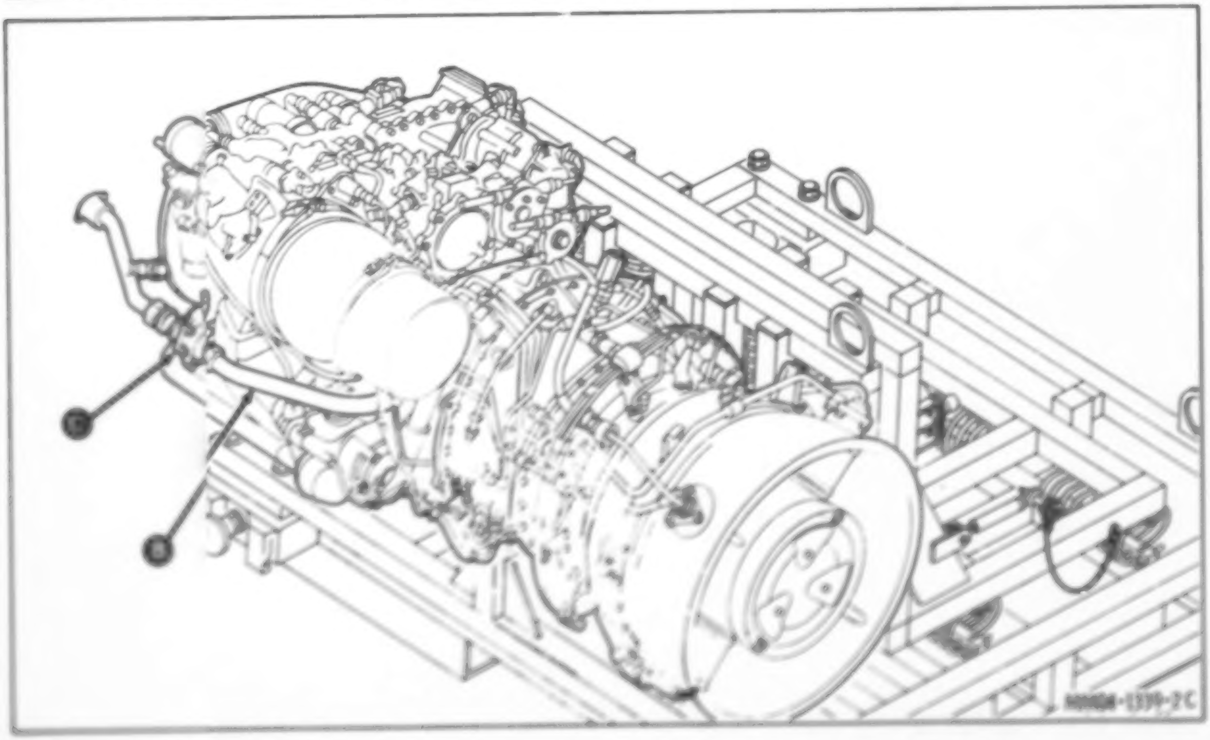
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4-2-21. ENGINE TEARDOWN - NO. 1 ENGINE ANTI-ICE AND BLEED AIR SYSTEM REMOVAL (cont) 4-2-21

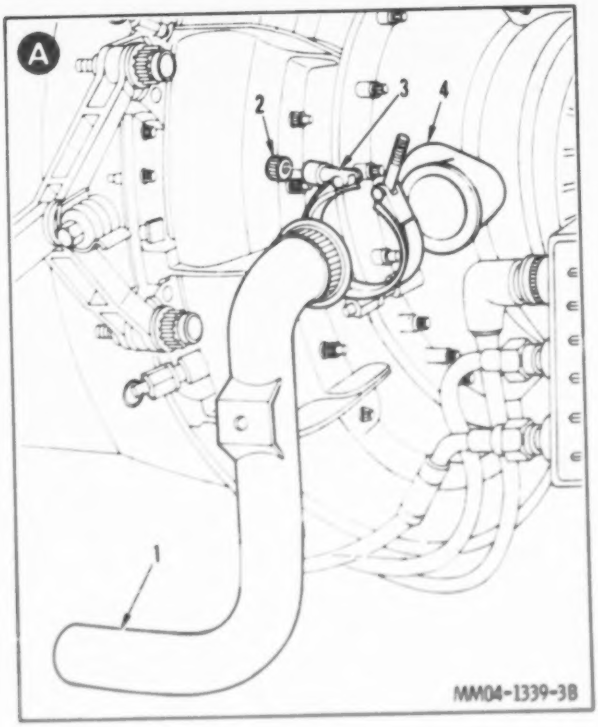
1. **Remove bleed air tube (1).**

   a. Remove coupling nut (2).

   b. Remove coupling (3) from bleed air tube (1) and port (4).

   c. Remove bleed air tube (1).

   d. Check air tube (1) for holes, dents, or abrasions (para 4-2-2).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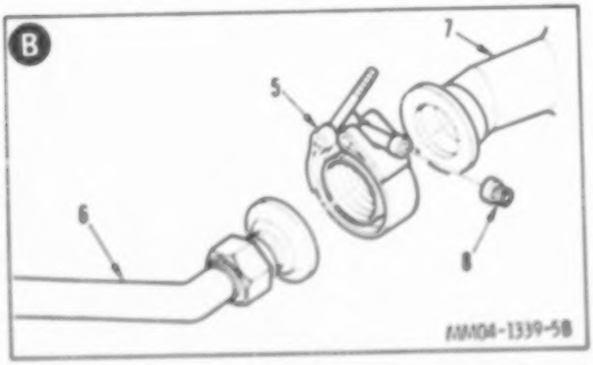
2. **Remove coupling (5) from anti-ice tube (6) and adapter (7).** Remove coupling nut (8).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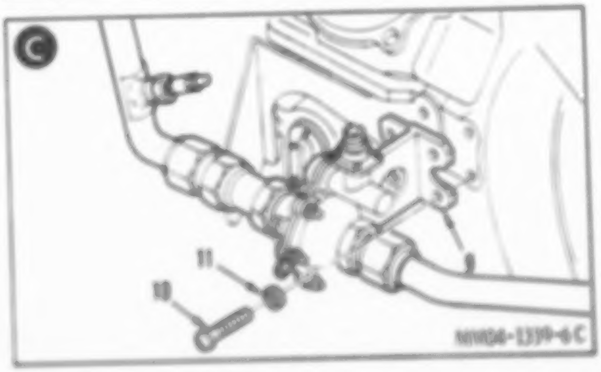
3. **Remove valve support (9).** Remove four screws (10) and washers (11).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MM04-1339-6C

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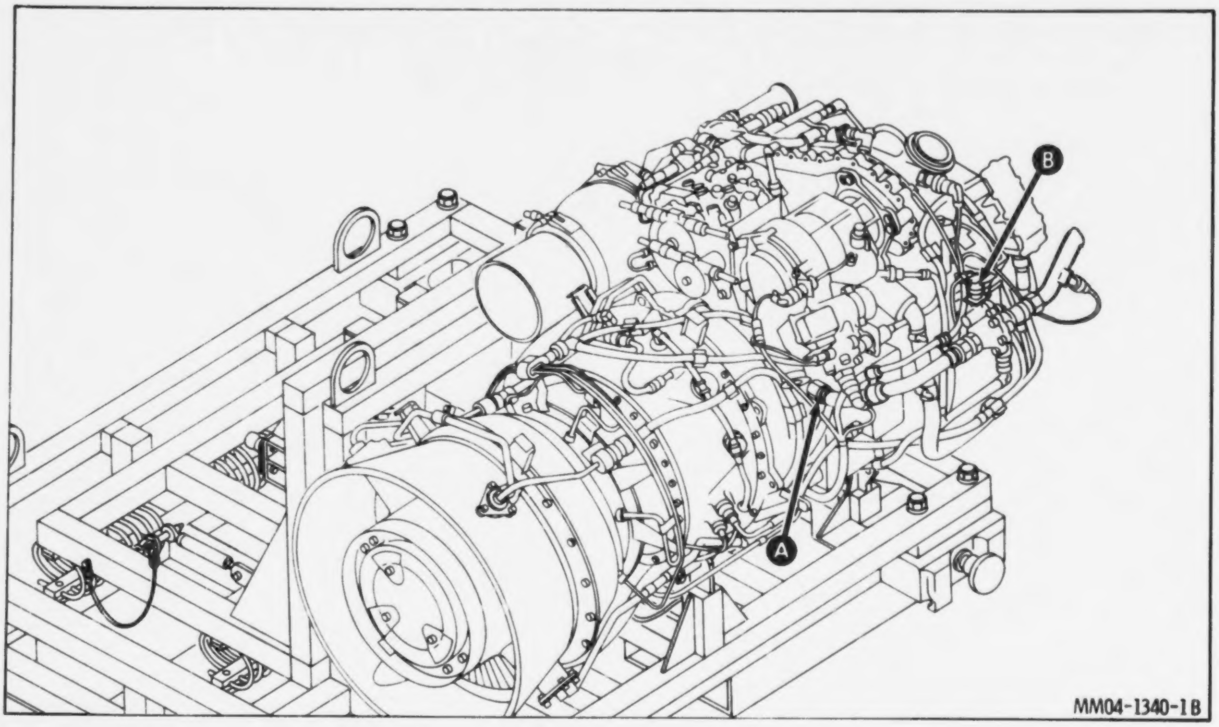
4-2-22. ENGINE TEARDOWN - NO. 2 ENGINE ANTI-ICE AND BLEED AIR SYSTEM REMOVAL 4-2-22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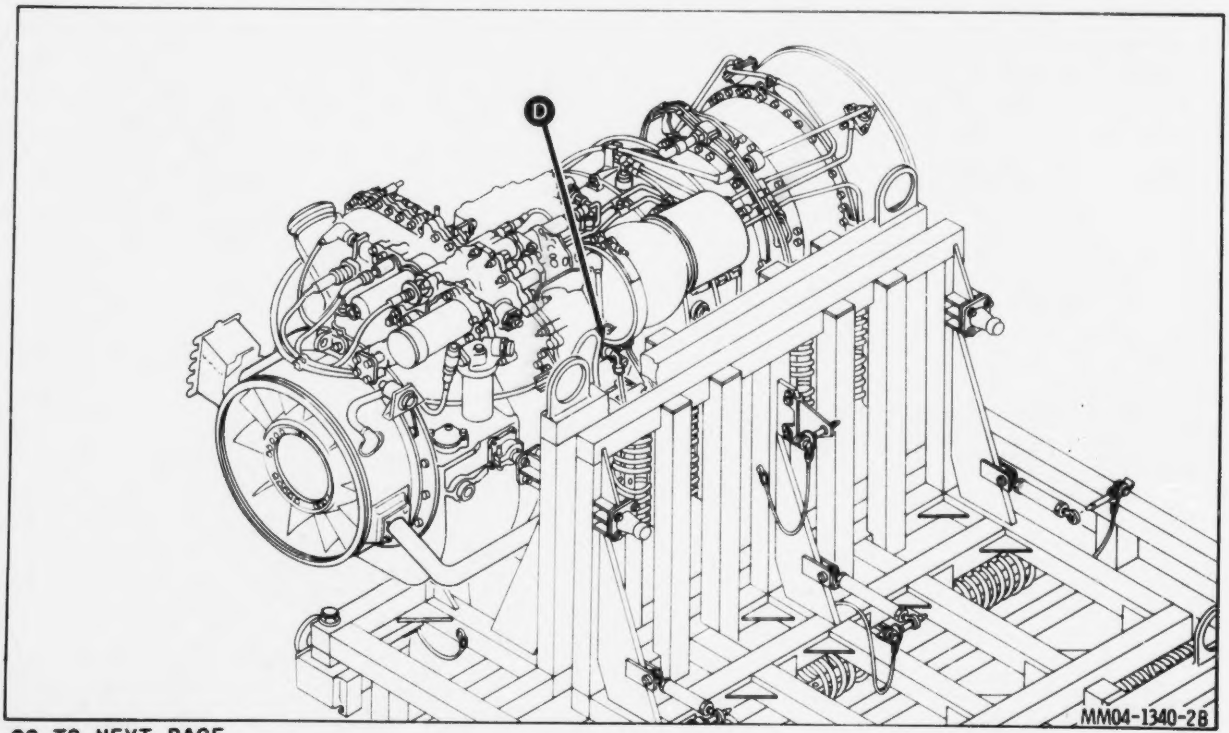
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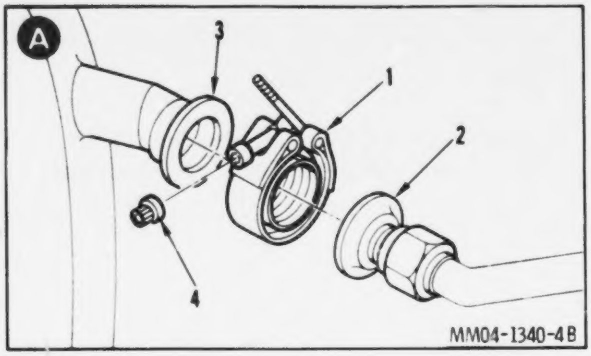
4-2-22. ENGINE TEARDOWN - NO. 2 ENGINE ANTI-ICE AND BLEED AIR SYSTEM REMOVAL (cont) 4-2-22

1. **Remove coupling (1) from anti-ice tube adapter (2) and port (3).** Remove coupling nut (4).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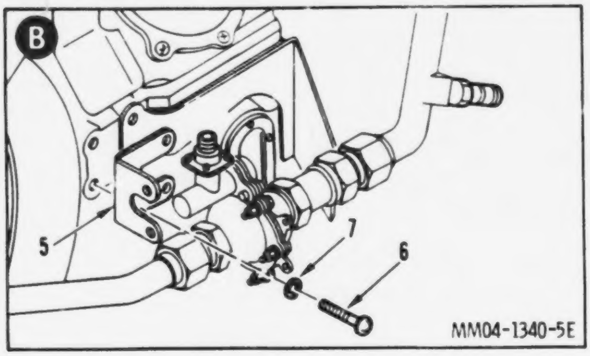
2. **Remove valve support (5).** Remove four screws (6) and washers (7).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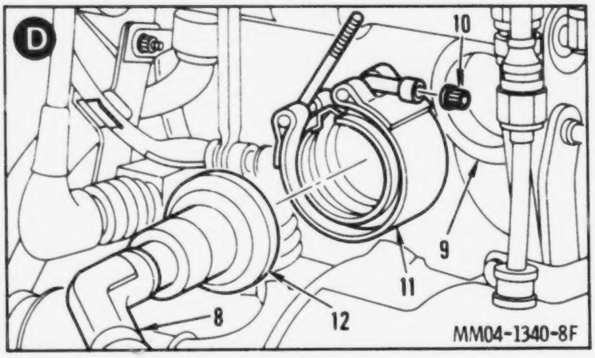
3. **Remove cooling door actuator hose (8) from port (9).**

   a. Remove coupling nut (10).

   b. Open coupling (11) and remove from adapter (12).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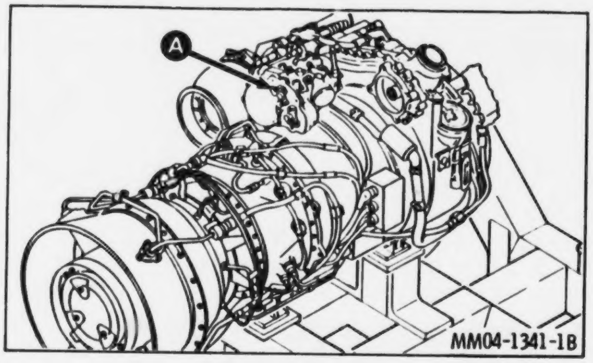
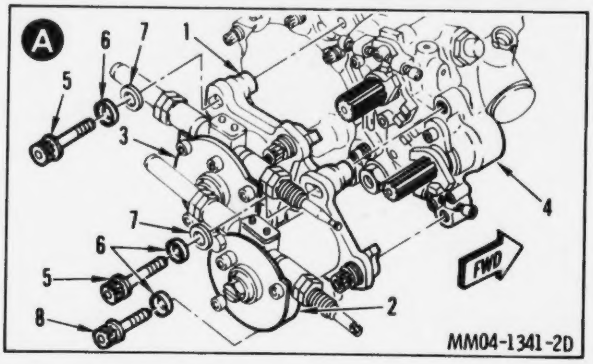
4-2-23. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE BASEPLATE AND GEARBOX REMOVAL 4-2-23

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

NOTE

This task is typical for No. 1 or No. 2 engine baseplate and gearbox.





A. REMOVAL

1. **Remove baseplate (1) load demand spindle gearbox (2) and PAS gearbox (3), from HMU (4).**

   a. Remove two bolts (5), washers (6), and washers (7).

   b. Remove lower bolt (8) and washer (6).

   c. Slide gearboxes (2) and (3) aft from HMU (4).

B. CLEANING

Wipe and clean outsides of gearboxes and baseplate (para 1-5-36).

C. INSPECTION

1. **Check gearboxes and baseplate for nicks and scratches.** Maximum depth of 0.015-inch allowed. No cracks allowed.

2. **Check gearbox splines for visible nicks.** None allowed.

3. **Check gearboxes and baseplate for corrosion** (para 1-5-38).

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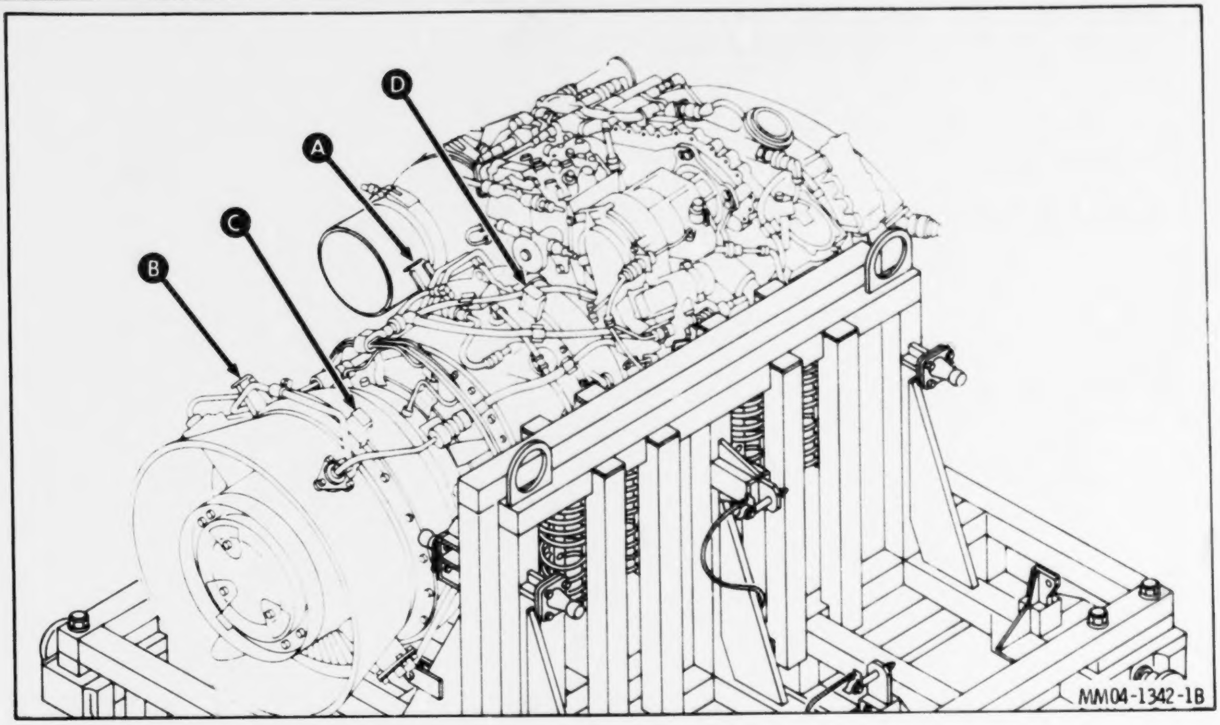
4-2-24. ENGINE TEARDOWN - NO. 1 and NO. 2 ENGINE SHROUD SUPPORT REMOVAL 4-2-24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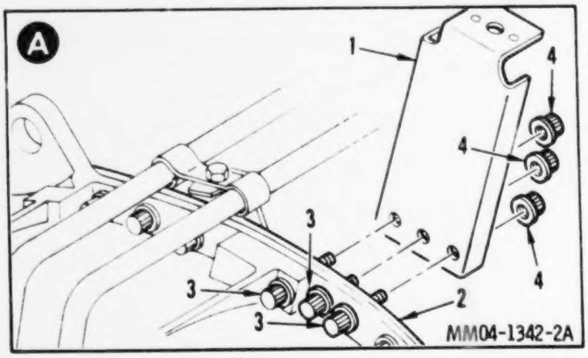
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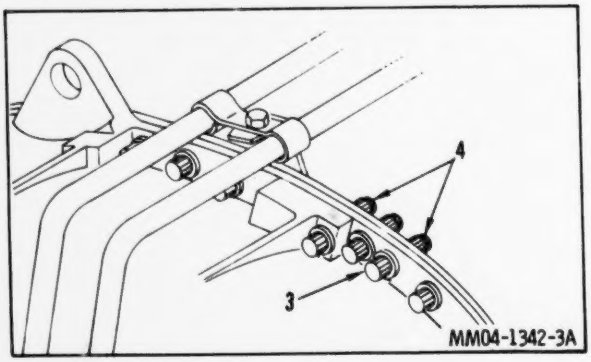
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MM04-1342-3A

NOTE

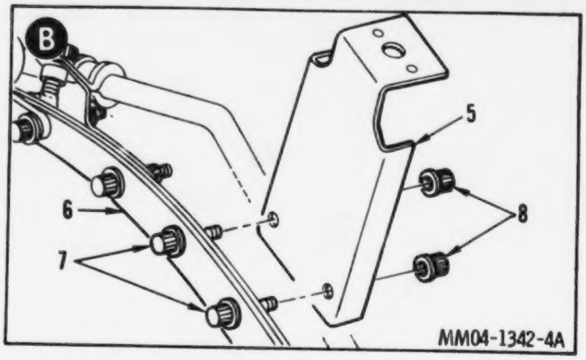
This task is typical for No. 1 or No. 2 engine shroud support assembly.

1. **Remove forward left radiation shield support (1) from diffuser case flange (2).**
   a. Hold bolts (3). Remove nuts (4).
   b. Remove support (1) from bolts (3).
   c. Hold bolts (3). Install nuts (4).

GO TO NEXT PAGE

4-2-24. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE SHROUD SUPPORT REMOVAL (cont) 4-2-24

2. **Remove aft left radiation shield support (5) from power turbine case flange (6).**
   a. Hold two bolts (7). Remove two nuts (8).
   b. Remove support (5) from bolts (7).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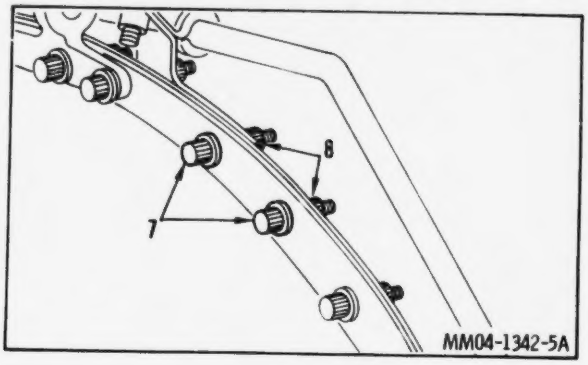
   c. Hold two bolts (7). Install two nuts (8).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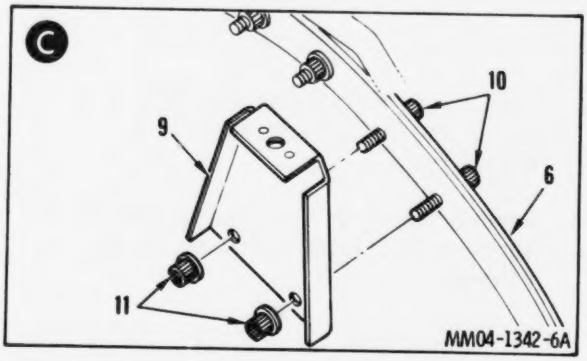
MM04-1342-5A

3. **Remove aft right radiation shield support (9) from power turbine case flange (6).**
   a. Hold two bolts (10). Remove two nuts (11).
   b. Remove support (9) from bolts (10).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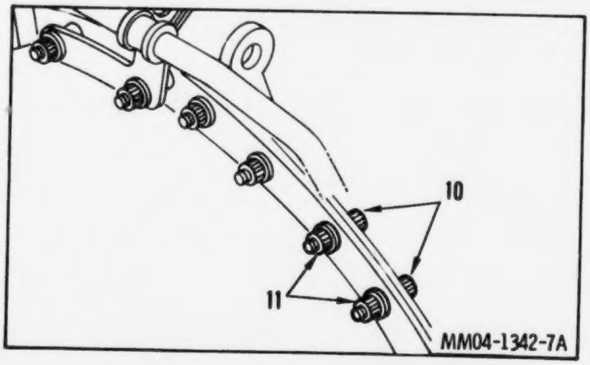
   c. Hold two bolts (10). Install two nuts (11).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4-2-24. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE SHROUD SUPPORT REMOVAL (cont) 4-2-24

4. **Remove forward right radiation shield support (13) from flange (2).**

    a. Hold bolt (14). Remove nut (15).

    b. Remove nut (15) from stud (16).

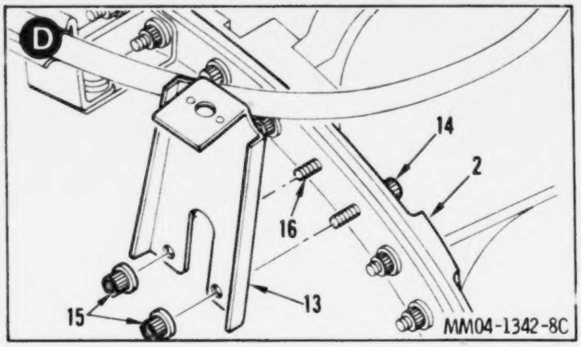
    c. Remove support (13) from bolt (14) and stud (16).

    d. Hold bolt (14). Install nut (15).

    e. Install nut (15) on stud (16).

5. **Check supports for cracks** (TM 55-1500-204-25/1).

6. **Check supports for corrosion** (para 1-5-38).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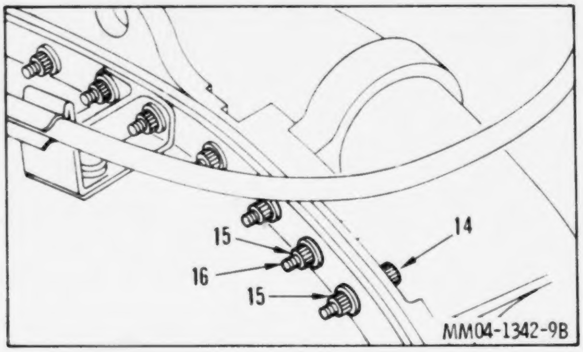
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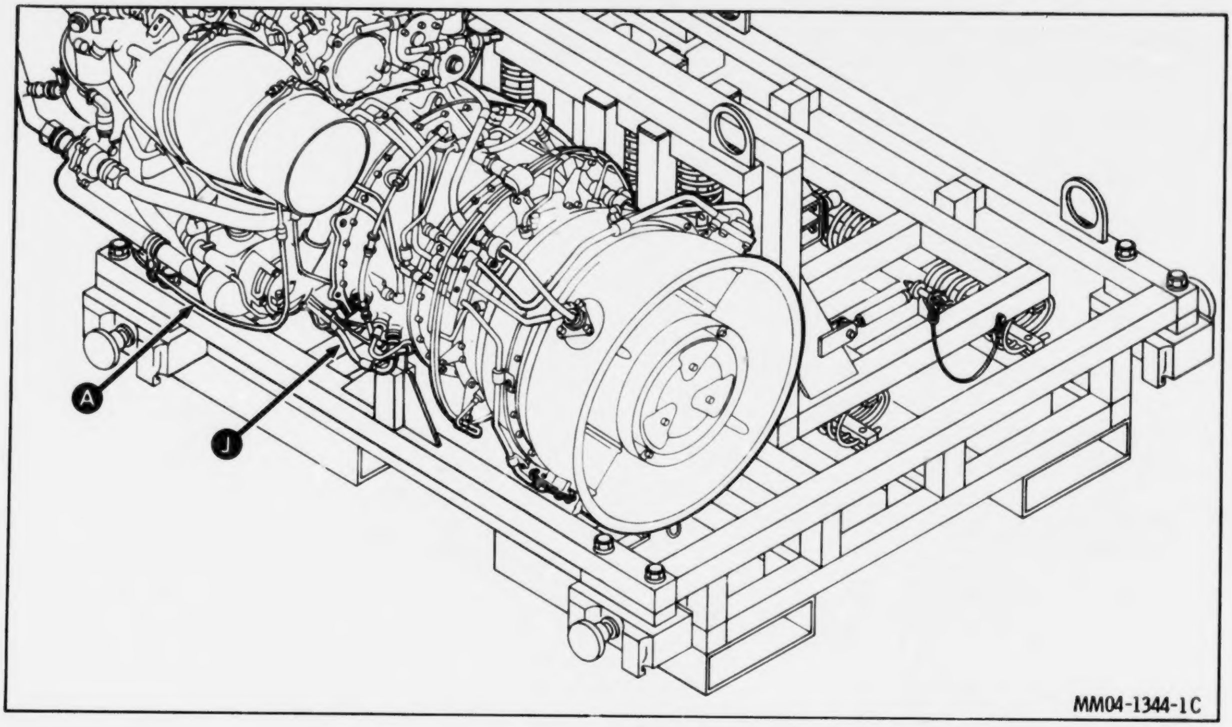
4-2-25. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE DRAIN SYSTEM REMOVAL 4-2-25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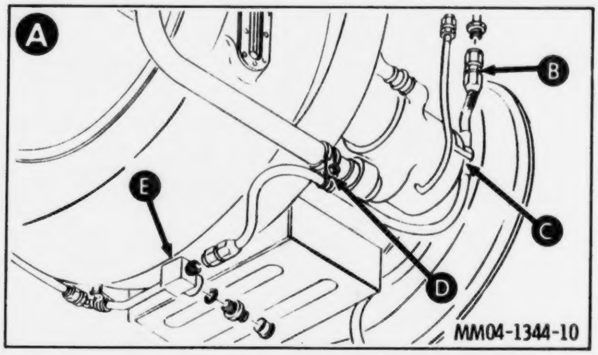
NOTE

This task is typical for No. 1 or No. 2 engine drain system.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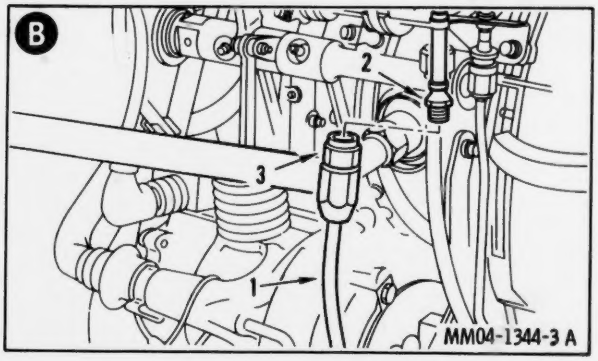
1. **Disconnect overspeed drain valve drain hose (1) from fitting (2).** Hold fitting (2). Remove nut (3).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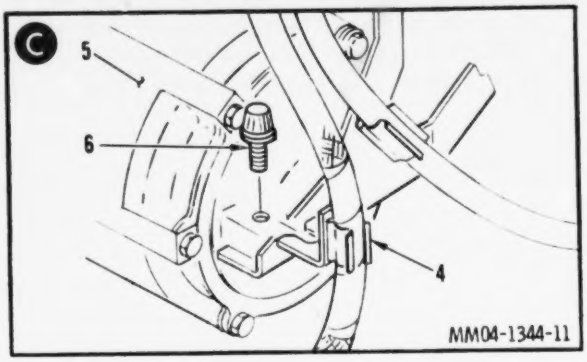
4-2-25. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE DRAIN SYSTEM REMOVAL (cont) 4-2-25

2. **Remove clip (4) from anti-icing valve (5).**
   a. Remove bolt (6).
   b. Remove clip (4).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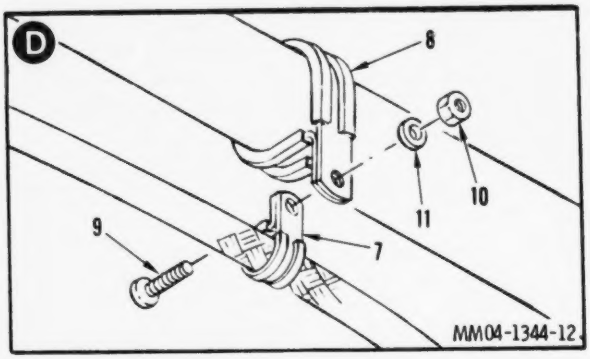
MM04-1344-11

3. **Remove clamp (7) from anti-ice manifold clamp (8).**
   a. Hold screw (9). Remove nut (10) and washer (11).
   b. Remove screw (9).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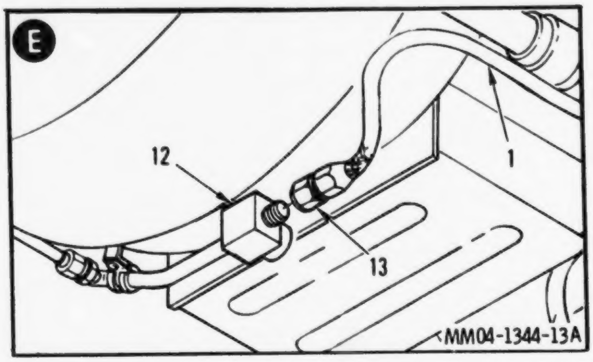
MM04-1344-12

4. **Remove drain hose (1) from manifold (12).** Hold manifold (12). Remove nut (13). Check drain hose (1) for holes, cracks, dents, or abrasions (para 4-2-2).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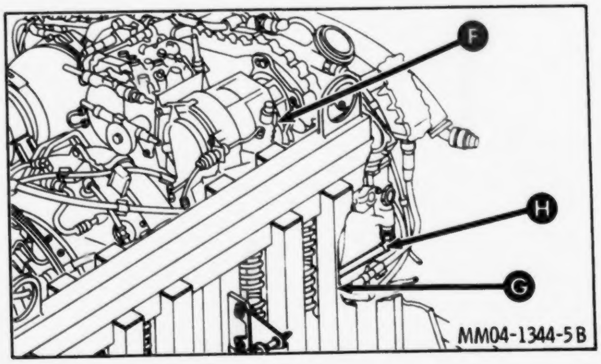
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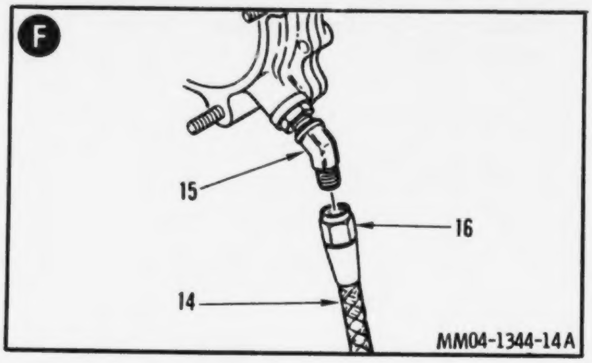
4-2-25. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE DRAIN SYSTEM REMOVAL (cont) 4-2-25

5. **Removal hydromechanical unit (HMU) vent/drain hose (14) from elbow (15).** Hold elbow (15). Remove nut (16).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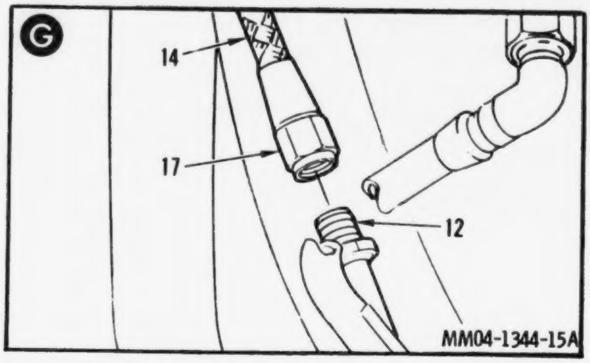
MM04-1344-14A

6. **Remove HMU vent/drain hose (14) from manifold (12).** Hold manifold (12). Remove nut (17). Check drain hose (14) for holes, cracks, dents, or abrasions (para 4-2-2).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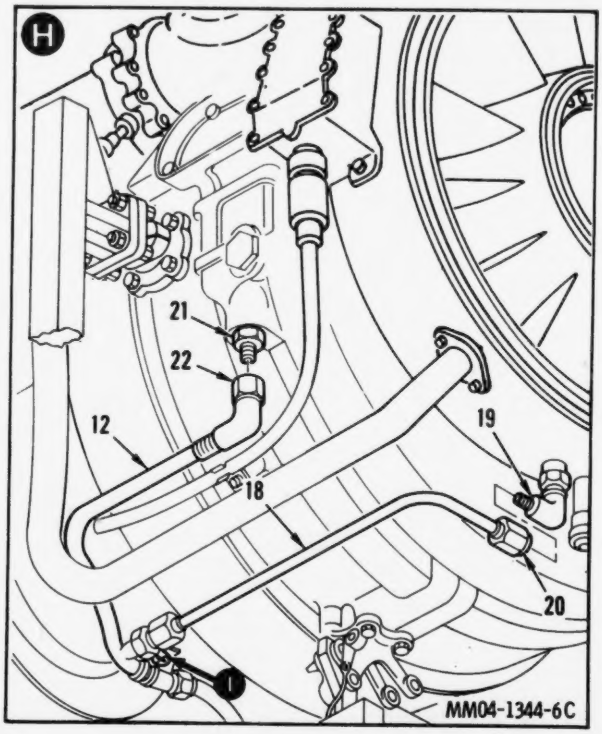
MM04-1344-15A

7. **Remove swirl frame drain line (18) from elbow (19).** Hold elbow (19). Remove nut (20). Check drain line (18) for holes, cracks, nicks, or abrasions (para 4-2-2).

8. **Remove drain manifold (12) from union (21).** Hold union (21). Remove nut (22).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MM04-1344-6C

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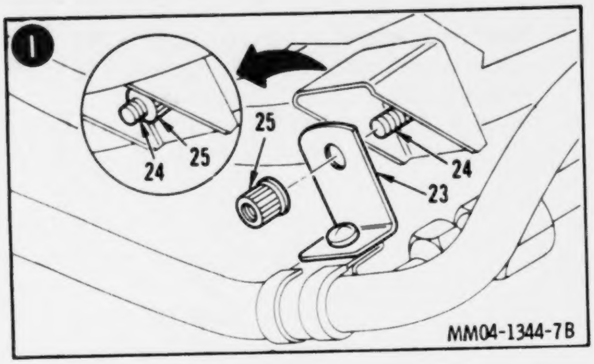
9. **Remove support clip (23) from stud (24).**

   a. Remove nut (25). Remove clip (23) from stud (24).

   b. Install nut (25) on stud (24).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MM04-1344-7B

10. **Remove union (21) from drain (26).**

    a. Remove union (21).

    b. Remove packing (27) from union (21). Discard packing.

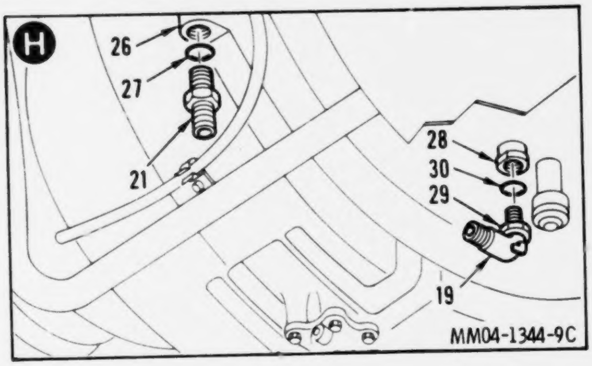
11. **Remove elbow (19) from drain (28).**

    a. Hold elbow (19).

    b. Loosen nut (29).

    c. Remove elbow (19) from drain (28).

    d. Remove and discard packing (30) from elbow (19).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MM04-1344-9C

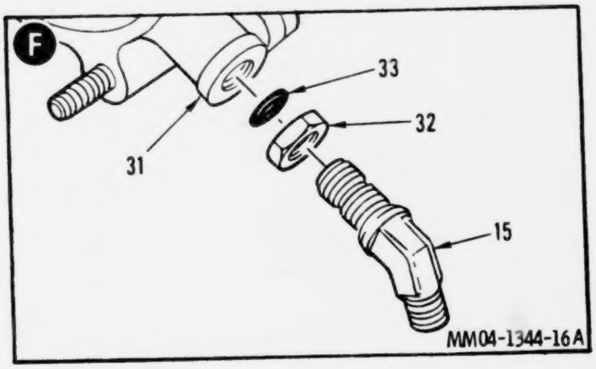
12. **Remove elbow (15) from drain (31).**

    a. Hold elbow (15).

    b. Loosen nut (32).

    c. Remove elbow (15) from drain (31).

    d. Remove and discard packing (33) from elbow (15).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MM04-1344-16A

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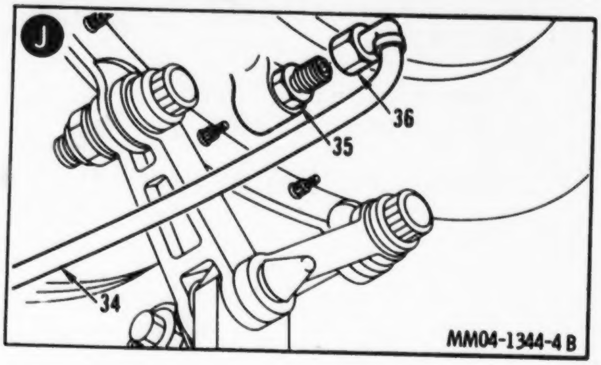
4-2-25. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE DRAIN SYSTEM REMOVAL (cont) 4-2-25

13. **Remove combustor drain hose (34) from union (35).** Hold union (35). Remove nut (36). Check drain hose (34) for holes, cracks, nicks, or abrasions (para 4-2-2).



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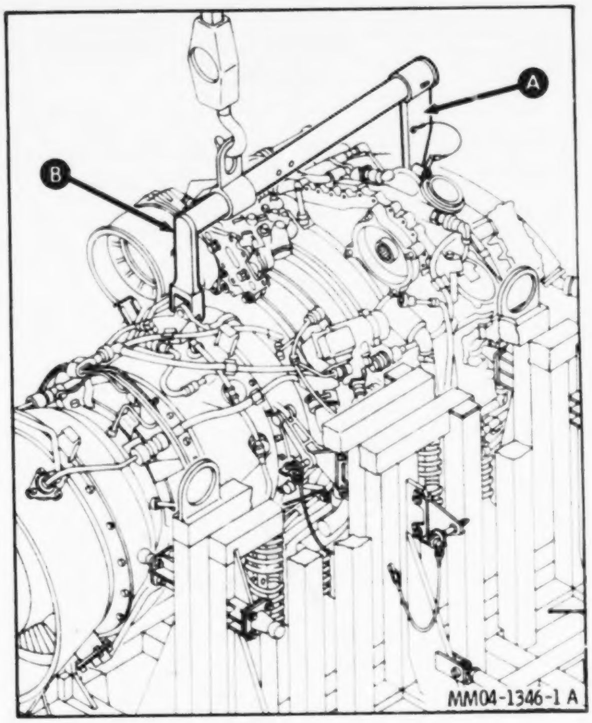
4-2-26. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE REMOVAL FROM HANDLING ADAPTER 4-2-26

NOTE

This task is typical for No. 1 or No. 2 engine.



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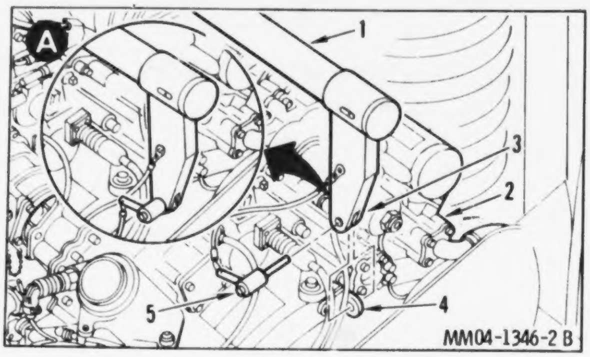
4-2-26. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE REMOVAL FROM HANDLING ADAPTER (cont) 4-2-26

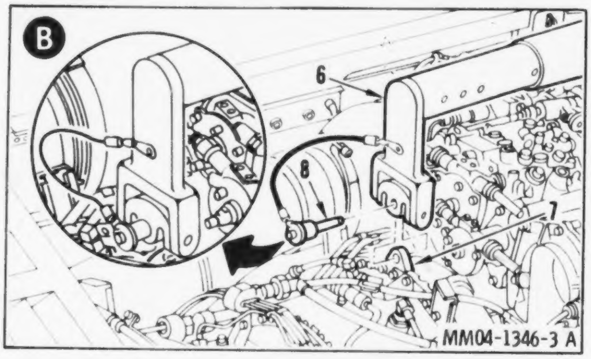


WARNING

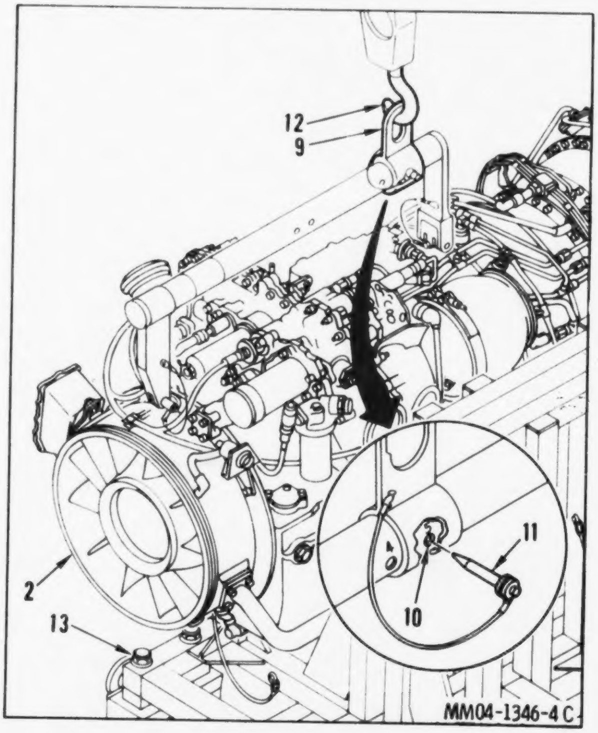
Hoisted components, if allowed to fall, can cause injury or death to personnel. Keep away from component mounting surfaces and loaded crane boom. If injury occurs, seek medical aid.

NOTE

- Before installing engine on handling adapter, loosen jam nuts on lower supports. Adjust supports to aline with engine lower mounts.



1. **Install sling (1) on engine (2).**
   a. Aline forward hanger link (3) with engine front lifting lug (4).
   b. Install pin (5) through forward hanger link (3) and front lifting lug (4).
   c. Aline aft hanger link (6) with aft lifting lug (7).
   d. Install pin (8) through aft hanger link (6) and aft lifting lug (7).
   e. Position sling lifting eye (9) at pinhole No. 5 (10).
   f. Install pin (11) in pinhole No. 5 (10).
2. **Connect lifting hook (12) to eye (9).**
3. **Apply tension to hook (12) to relieve weight of engine (1) from handling adapter (13).**



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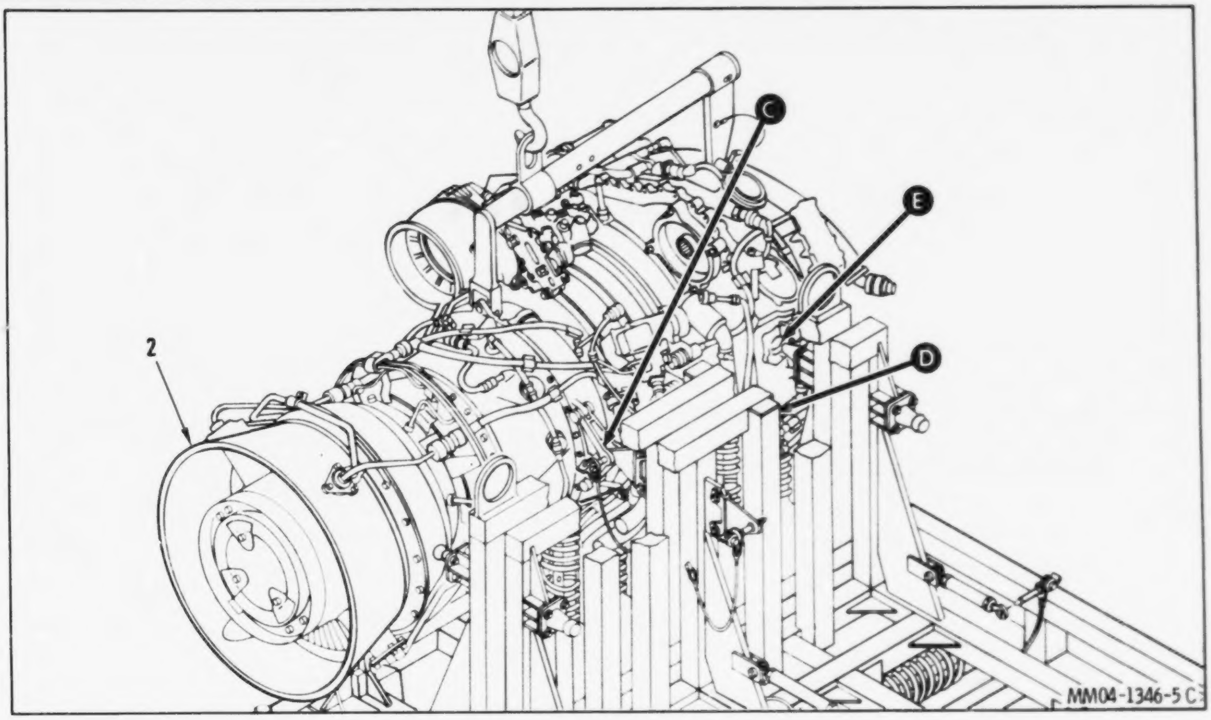
4-2-26. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE REMOVAL FROM HANDLING ADAPTER (cont) 4-2-26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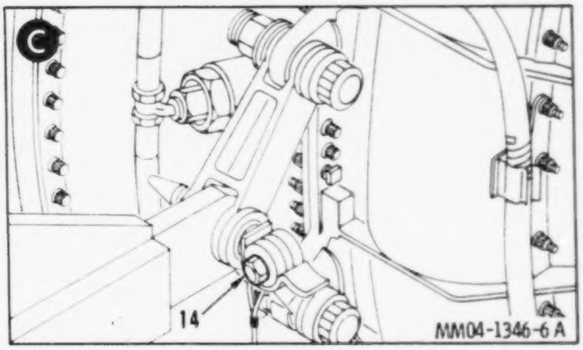
a. Unlock engine mount support pins (14) and (15).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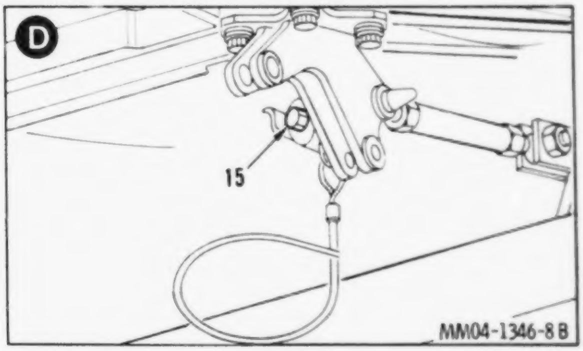
MM04-1346-6 A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MM04-1346-8 B

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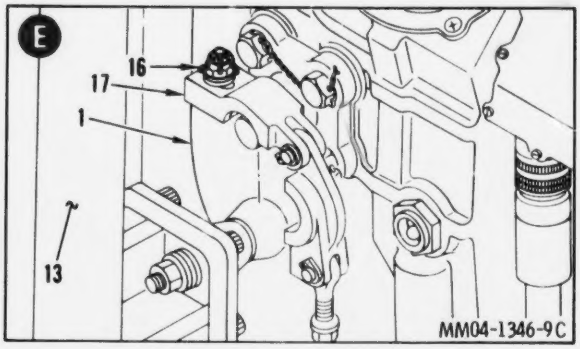
4-2-26. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE REMOVAL FROM HANDLING ADAPTER (cont) 4-2-26

b. Loosen nut (16) on forward inboard mount (17).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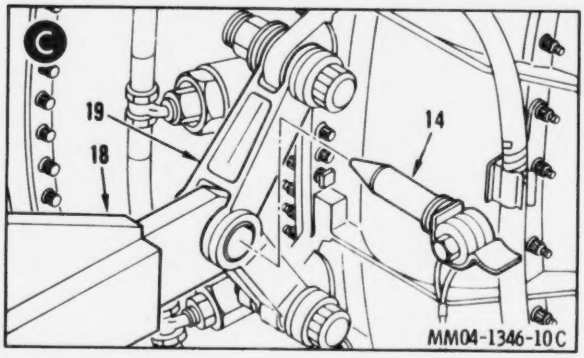
MM04-1346-9C

c. Remove pin (14) from handling adapter support (18) and aft inboard engine support (19).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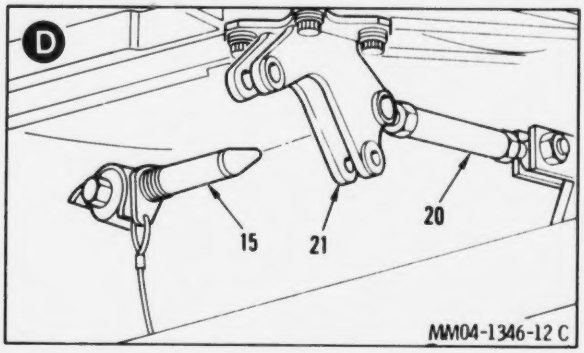
MM04-1346-10C

d. Remove pin (15) from handling adapter support (20) and forward lower engine mount (21).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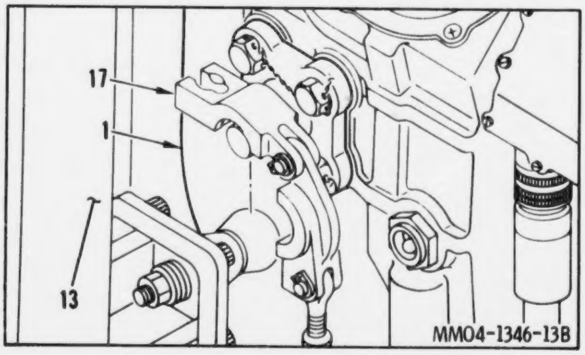
MM04-1346-12 C

e. Open forward inboard mount (17). Move handling adapter (13) from engine (1).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MM04-1346-13B

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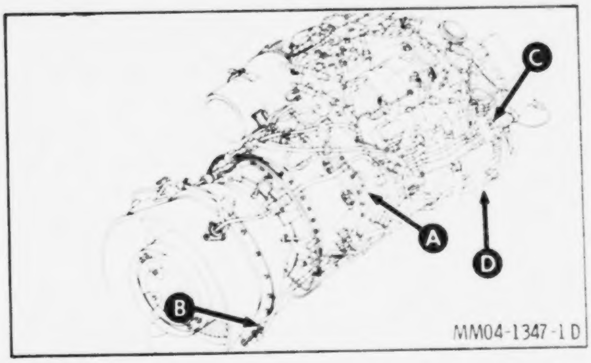
4-2-27. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE MOUNT REMOVAL 4-2-27

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

NOTE

This task is typical for No. 1 or No. 2 engine mounts.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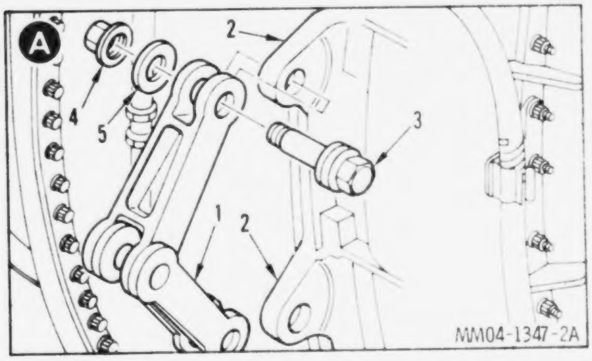
MM04-1347-1 D

A. REMOVAL

1. **Removal aft inboard mount (1) from diffuser case (2).**
    a. Hold two bolts (3).
    b. Remove two nuts (4) and two washers (5).
    c. Remove two bolts (3).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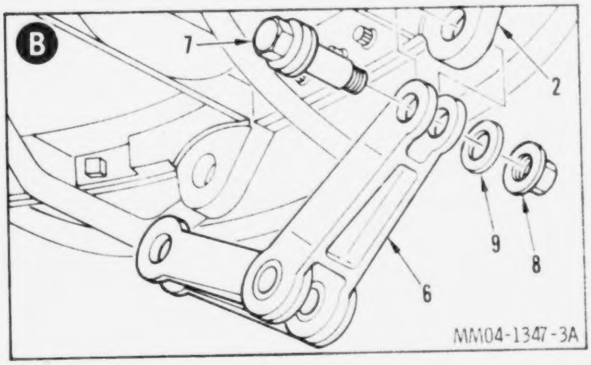
MM04-1347-2A

2. **Remove aft lower mount (6) from diffuser case (2).**
    a. Hold two bolts (7).
    b. Remove two nuts (8) and washers (9).
    c. Remove two bolts (7).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MM04-1347-3A

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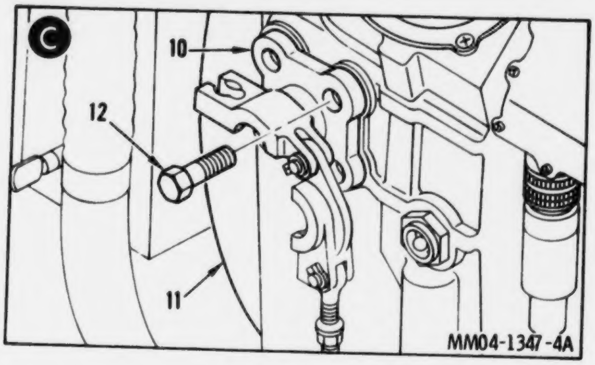
4-2-27. ENGINE TEARDOWN - NO. 1 AND NO. 2 ENGINE MOUNT REMOVAL (cont) 4-2-27

3. **Remove forward inboard mount (10) from main frame (11).**

   a. Remove lockwire.

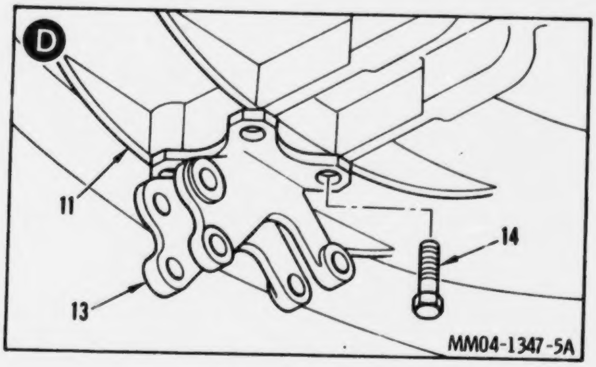
   b. Remove four bolts (12).



4. **Remove forward lower mount (13) from frame (11).**

   a. Remove lockwire.

   b. Remove four bolts (14).



B. CLEANING

Wipe and clean removed mounts (para 1-5-36).

C. INSPECTION

1. **Check mounts for cracks.** None allowed.
2. **Check mounts for corrosion** (para 1-5-38).

END OF TASK

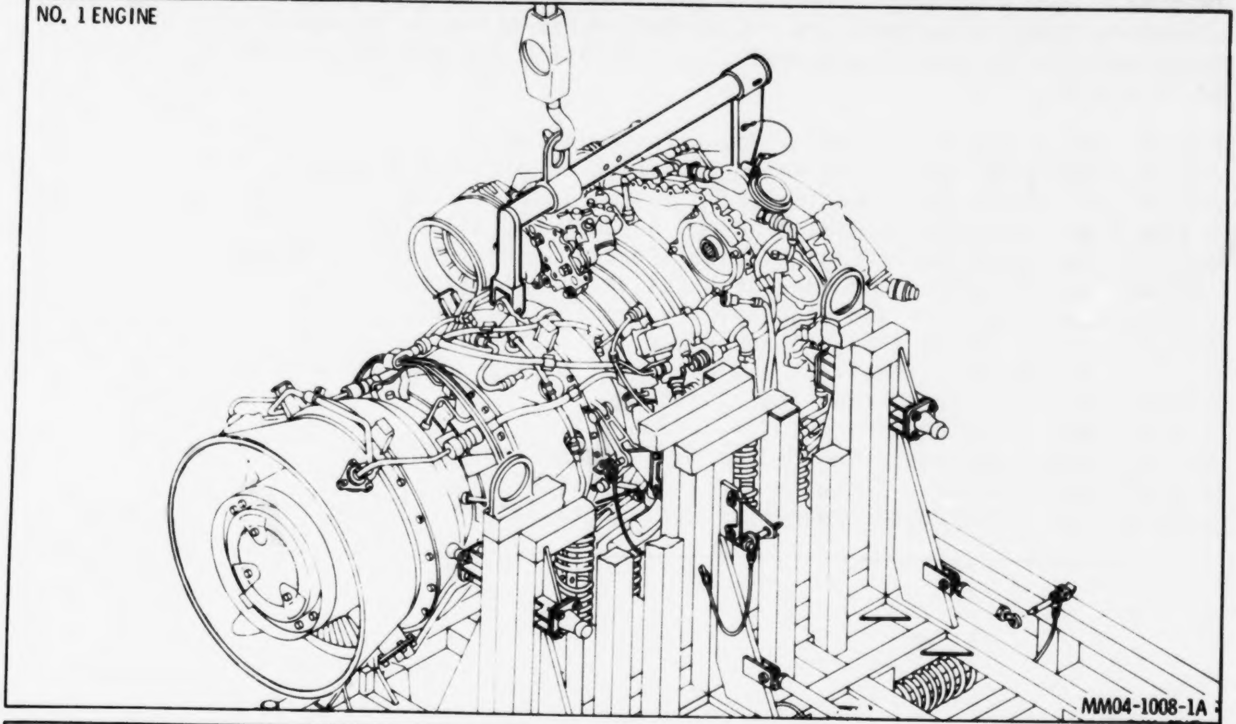
4-2-28. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE 4-2-28

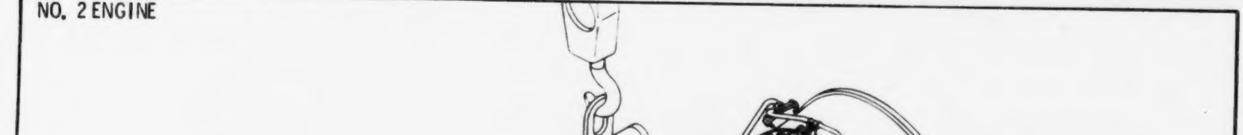
This task (off aircraft) covers the following paragraphs for installation of accessory items to prepare the engine for installation in the helicopter. Paragraphs are in proper sequence of installation and may be used for No. 1 and/or No. 2 engine.

4-2-29. No. 1 and No. 2 Engine Mount Installation
4-2-30. No. 1 and No. 2 Engine Installation on Handling Adapter
4-2-31. No. 1 and No. 2 Engine Drain System Installation
4-2-32. No. 1 and No. 2 Engine Shroud Support Installation
4-2-33. No. 1 and No. 2 Engine Baseplate and Gearboxes Installation
4-2-34. No. 1 Starter and Regulating Valve Installation
4-2-35. No. 2 Starter and Regulating Valve Installation
4-2-36. No. 1 Engine Anti-Ice and Bleed Air System Installation
4-2-37. No. 2 Engine Anti-Ice and Bleed Air System Installation
4-2-38. No. 1 Engine Wiring Installation
4-2-39. No. 2 Engine Wiring Installation
4-2-40. No. 1 and No. 2 Engine Fuel Inlet Hose Installation
4-2-41. No. 1 and No. 2 Engine Air Inlet Installation
4-2-42. No. 1 and No. 2 Engine Air Duct Installation

GO TO NEXT PAGE

4-2-28. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE (cont) 4-2-28


NO. 1 ENGINE
MM04-1008-1A


NO. 2 ENGINE
MM04-1008-2A

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4-2-28. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE (cont) 4-2-28

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Kit, Aircraft Adapter	1730-01-240-6743
Sling, Engine	4920-01-108-3484
Adapter, 1/2 to 3/4 Drive	5120-00-227-8088
Adapter, 3/8 to 1/4 drive	5120-00-227-8095
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Wrench, Torque, 3/8 Drive	5120-00-288-8865

Materials/Parts:

	Seal (2)
	Packing (10)
(E16)	Petrolatum
(E42)	Lubricating Oil
(E29)	Lockwire
(E34)	Lockwire

Personnel Required:

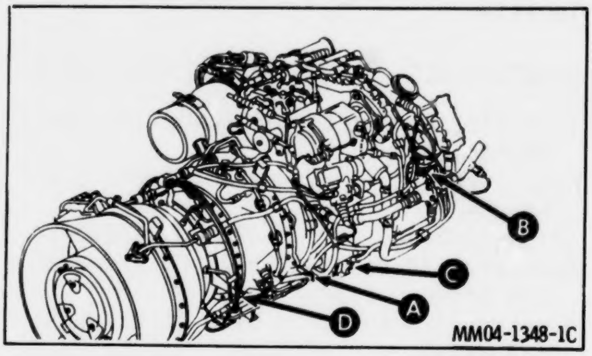
67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

GO TO NEXT PARAGRAPH

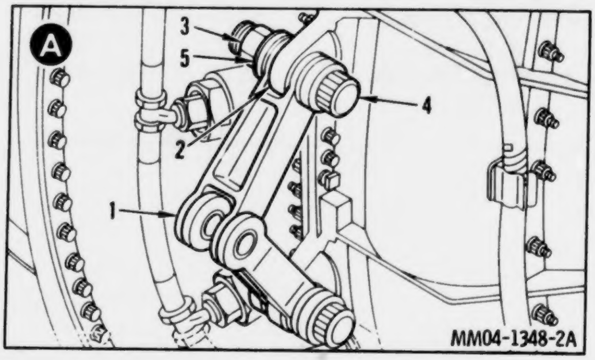
4-2-29. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE MOUNT INSTALLATION 4-2-29

NOTE

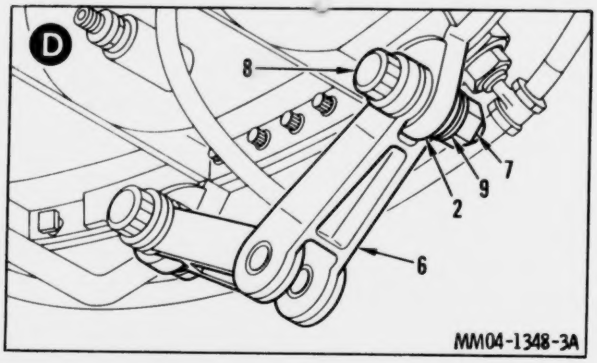
This task is typical for No. 1 or No. 2 engine mounts.



1. **Install aft inboard mount (1) on diffuser case (2). Torque two nuts (3) to 145 INCH-POUNDS.**
    a. Insert two bolts (4) through mount (1) and case (2).
    b. Install two washers (5) and nuts (3) on two bolts (4).
    c. Hold two bolts (4). Torque two nuts (3) to **145 INCH-POUNDS.** Use 3/8 drive torque wrench.



2. **Install aft lower mount (6) on diffuser case (2).** Torque two nuts (7) to **145 INCH-POUNDS.**
    a. Insert two bolts (8) through mount (6) and case (2).
    b. Install two washers (9) and nuts (7) on two bolts (8).
    c. Hold two bolts (8). Torque two nuts (7) to **145 INCH-POUNDS.** Use 3/8 drive torque wrench.



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4-2-29. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE MOUNT INSTALLATION (cont) 4-2-29

3. **Install forward inboard mount (10) on main frame (11).** Torque four bolts (12) to **145 INCH-POUNDS.**

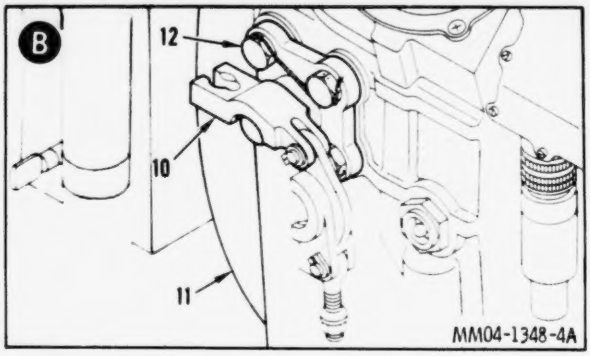
   a. Aline mount (10) on frame (11).

   b. Install four bolts (12).

   c. Torque four bolts (12) to **145 INCH-POUNDS.** Use 3/8 drive torque wrench.

   d. Lockwire two upper bolts (12). Use lockwire (E29).

   e. Lockwire two lower bolts (12). Use lockwire (E29).



4. **Install forward lower mount (13) on frame (11).** Torque four bolts (14) to **145 INCH-POUNDS.**

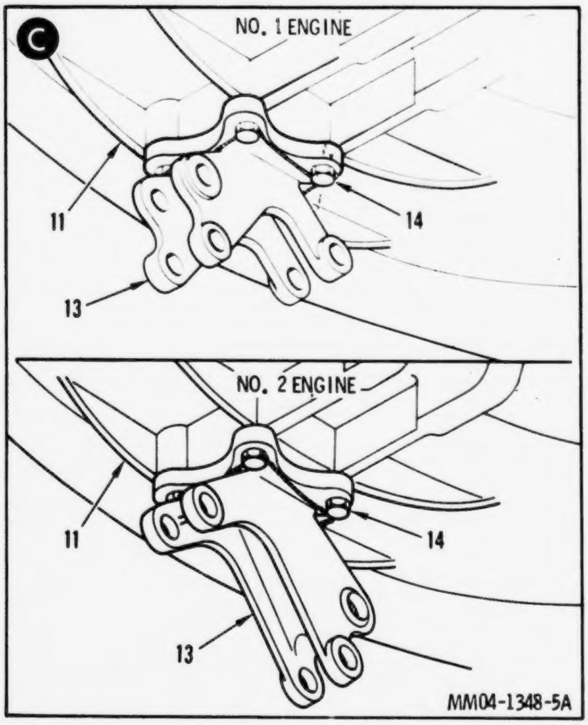
   a. Aline mount (13) on frame (11).

   b. Install four bolts (14).

   c. Torque four bolts (14) to **145 INCH-POUNDS.** Use 3/8 drive torque wrench.

   d. Lockwire four bolts (14). Use lockwire (E29).

5. **Inspect (TI).**



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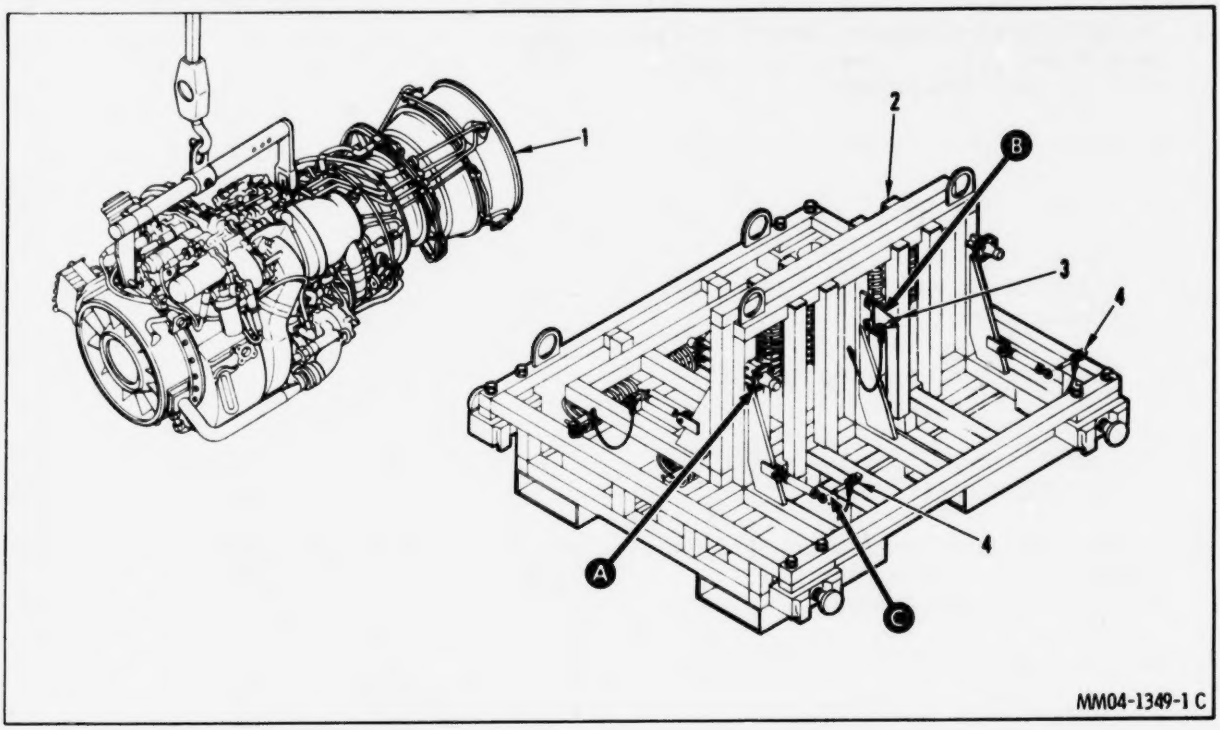
4-2-30. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE INSTALLATION ON HANDLING ADAPTER 4-2-30



WARNING

Hoisted components, if allowed to fall, can cause injury or death to personnel. Keep away from component mounting surfaces and loaded crane boom. If injury occurs, seek medical aid.

NOTE

- This task is typical for No. 1 or No. 2 engine.
- Before installing engine on handling adapter, loosen jam nuts on lower supports. Adjust supports to aline with engine lower mounts.

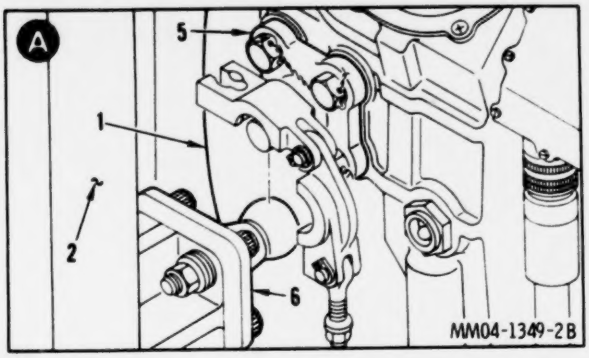
1. **Install engine (1) on handling adapter (2).**

   a. Remove support pins (3) and (4) from adapter (2).

GO TO NEXT PAGE

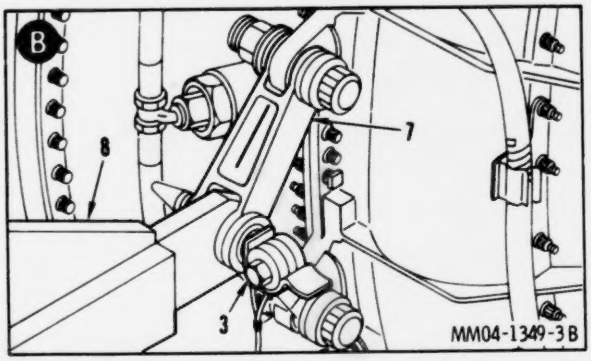
4-2-30. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE INSTALLATION ON HANDLING ADAPTER (cont) 4-2-30

b. Aline engine (1) and forward inboard mount (5) with handling adapter (2) forward inboard support (6).



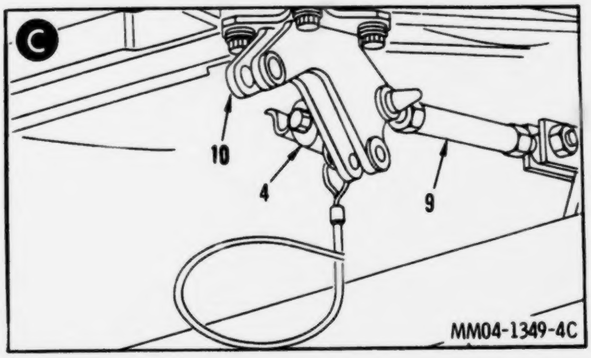
c. Aline engine aft inboard mount (7) with handling adapter (2) aft inboard support (8).

d. Install pin (3) through adapter (2) aft inboard support (8) and engine aft inboard mount (7).



e. Install support pin (4) through handling adapter (2) forward lower support (9) and engine forward lower mount (10).

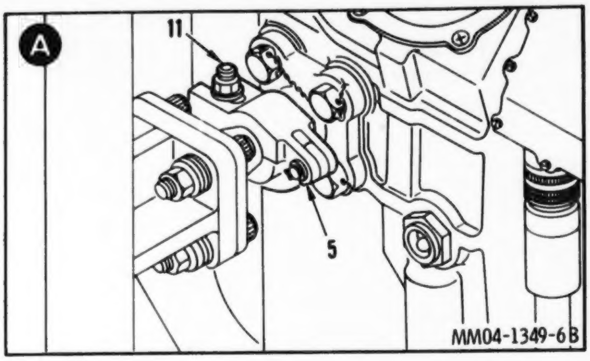
f. Lock two pins (3) and (4).



4-2-30. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE INSTALLATION ON HANDLING ADAPTER (cont) 4-2-30

g. Close forward inboard mount (5).

h. Tighten nut (11).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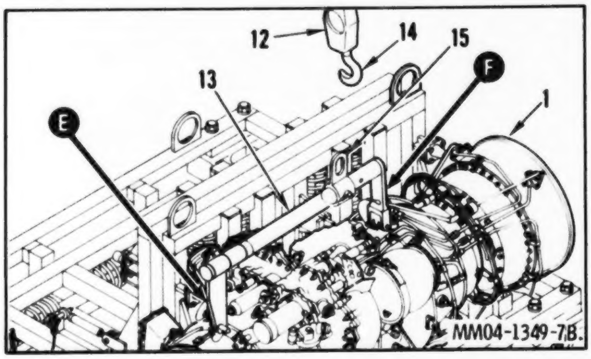
MM04-1349-6B

2. **Release tension on lifting cable (12).**

3. **Remove engine sling (13) from engine (1).**

   a. Remove lifting hook (14) from sling lifting eye (15).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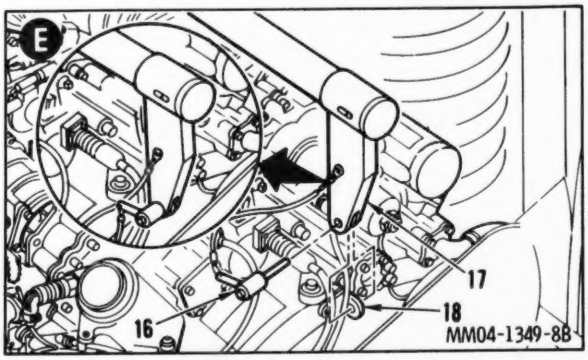
   b. Remove pin (16) from forward hanger link (17) and front lifting lug (18).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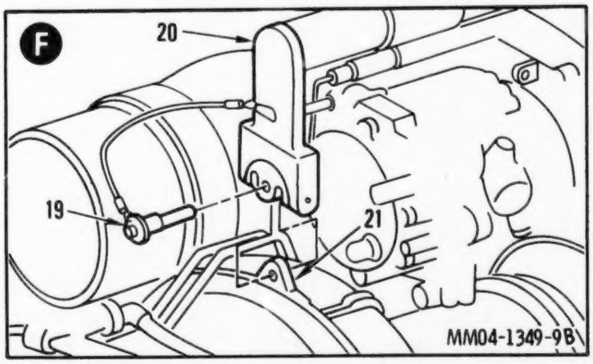
MM04-1349-8B

   c. Remove pin (19) from aft hanger link (20) and aft lifting lug (21).

4. **Inspect (TI).**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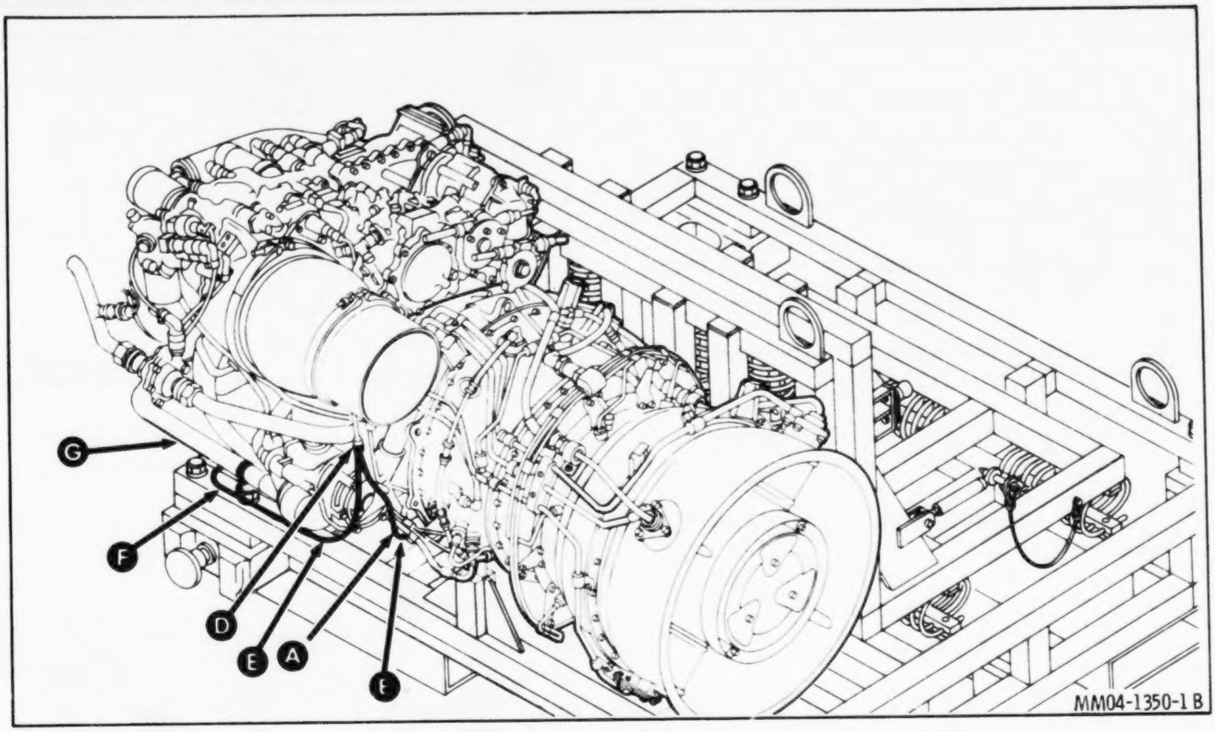
4-2-31. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE DRAIN SYSTEM INSTALLATION 4-2-31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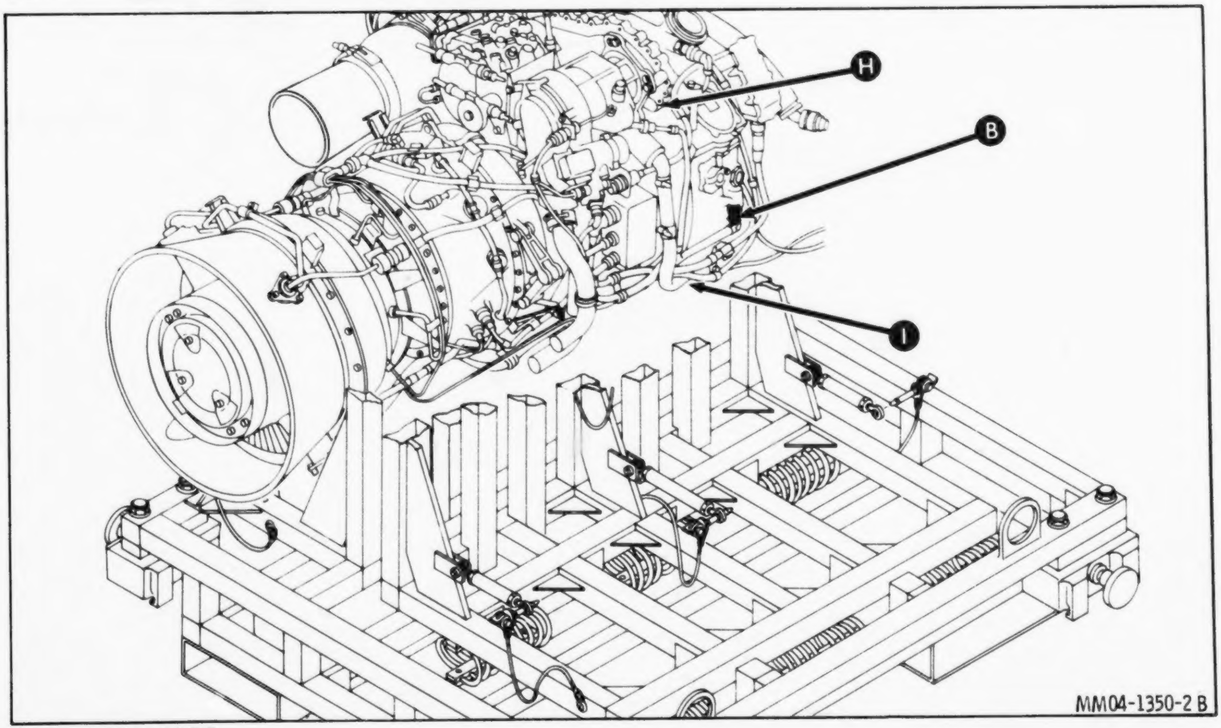
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MM04-1350-2 B

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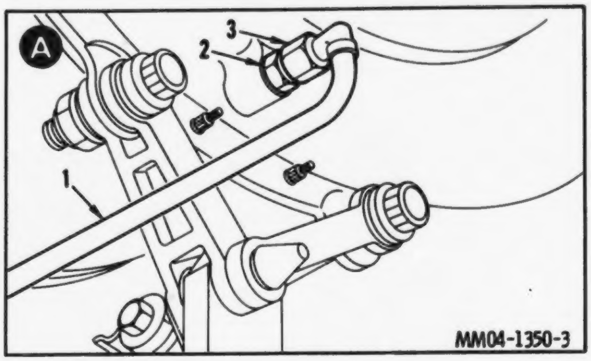
4-2-31. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE DRAIN SYSTEM INSTALLATION (cont) 4-2-31

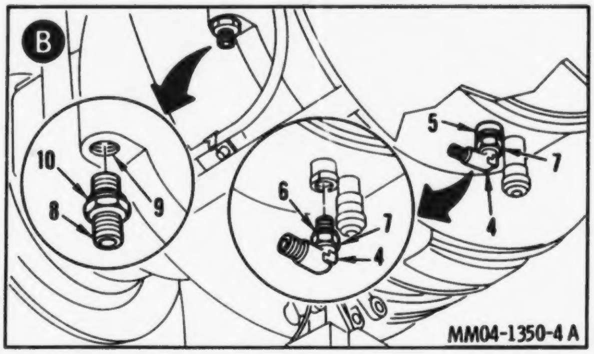
NOTE

This task is typical for No. 1 or No. 2 engine drain system.

1. **Install combustor drain hose (1) on diffuser case fitting (2).**
   a. Lubricate threaded area of fitting (2). Use petrolatum (E16).
   b. Install combustor drain hose nut (3) on fitting (2).
   c. Hold fitting (2). Tighten nut (3).



2. **Install elbow (4) in swirl frame drain (5).**
   a. Lubricate new packing (6). Use petrolatum (E16).
   b. Install packing (6) on elbow (4).
   c. Install elbow (4) with nut (7).



3. **Install union (8) in main frame common drain (9).**
   a. Lubricate new packing (10). Use petrolatum (E16).
   b. Install packing (10) on union (8).
   c. Install union (8) in drain (9).

GO TO NEXT PAGE

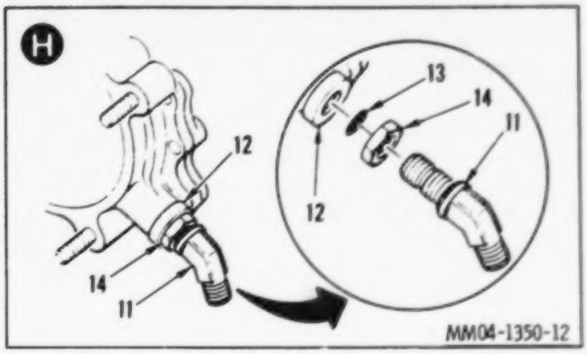
4-2-31. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE DRAIN SYSTEM INSTALLATION (cont) 4-2-31

4. **Install elbow (11) in hydromechanical unit (HMU) drain (12).**

   a. Lubricate new packing (13). Use petrolatum (E16).

   b. Install packing (13) on elbow (11).

   c. Install elbow (11) with nut (14).



5. **Connect drain manifold (15) to union (8).**

   a. Lubricate threaded area of union (8). Use petrolatum (E16).

   b. Install nut (16) on union (8).

6. **Connect swirl frame drain line (17) to swirl frame elbow (4).**

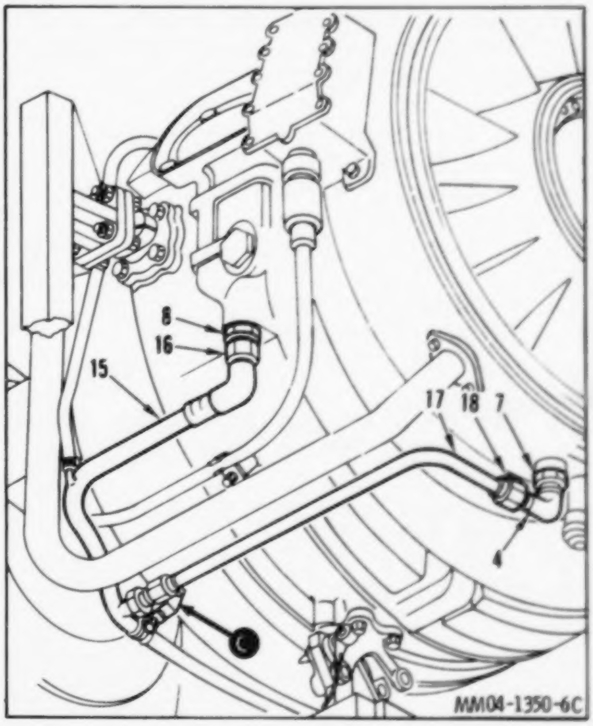
   a. Lubricate threaded area of elbow (4). Use petrolatum (E16).

   b. Install nut (18) on elbow (4).

7. **Tighten common drain line nut (16).** Hold union (8). Tighten nut (16).

8. **Tighten elbow nut (7).** Hold elbow (4). Tighten nut (7).

9. **Tighten swirl frame line nut (18).** Hold elbow (4). Tighten nut (18).



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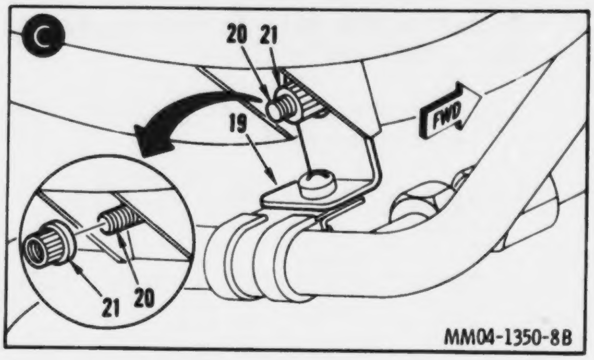
4-2-31. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE DRAIN SYSTEM INSTALLATION (cont) 4-2-31

10. **Install common drain line support clip (19) on main frame mounting stud (20).**

    a. Loosen nut (21). Position clip (19) on stud (20).

    b. Install nut (21) on stud (20).

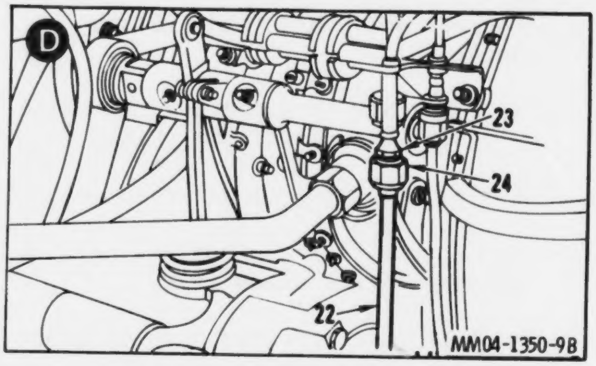


11. **Torque nut (21) to 22 INCH-POUNDS.** Use 3/8 drive torque wrench.

12. **Connect overspeed drain valve drain line (22) to overspeed drain valve drain fitting (23).**

    a. Lubricate threaded area of fitting (23). Use petrolatum (E16).

    b. Install nut (24) on fitting (23).

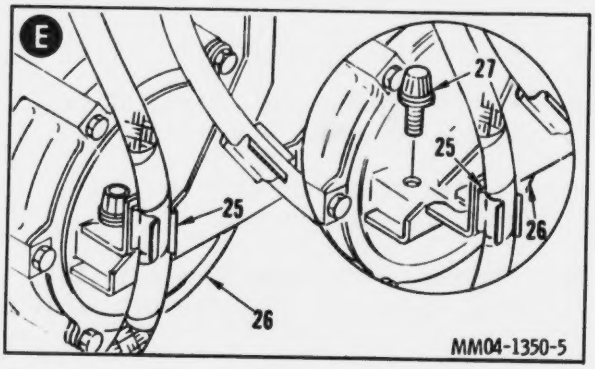


13. **Tighten drain line nut (24).** Hold fitting (23). Tighten nut (24).

14. **Install overspeed drain valve drain hose clip (25) on anti-icing valve.**

    a. Loosen bolt (27). Install clip (25) on valve (26).

    b. Tighten bolt (27).



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4-2-31. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE DRAIN SYSTEM INSTALLATION (cont) 4-2-31

17. **Install overspeed drain valve drain hose clamp (28) on anti-ice manifold clamp (29).**

    a. Insert screw (30) into clamps (28) and (29).

    b. Hold screw (30). Install washer (31) and nut (32).

18. **Connect hose (22) to manifold (15).**

    a. Lubricate threaded area of manifold (15). Use petrolatum (E16).

    b. Install nut (33) on manifold (15).

    c. Hold manifold (15). Tighten nut (33).

19. **Connect hydromechanical unit (HMU) vent/drain hose (34) to HMU elbow (11).**

    a. Lubricate threaded area of elbow (11). Use petrolatum (E16).

    b. Install nut (35) on elbow (11).

    c. Hold elbow (11) and tighten nut (35).

20. **Connect HMU drain hose (34) to drain manifold (15).**

    a. Lubricate threaded area of manifold (15). Use petrolatum (E16).

    b. Install nut (36) on manifold (15).

    c. Hold manifold (15). Tighten nut (36).

21. **Inspect (TI).**

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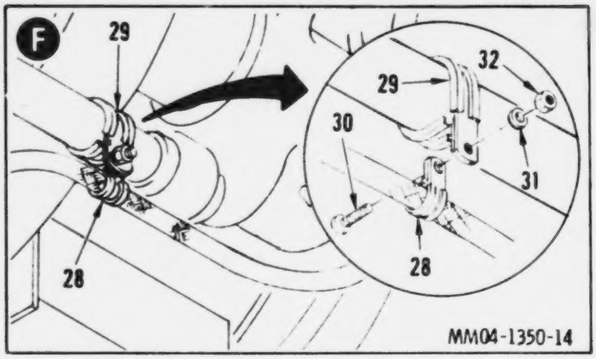
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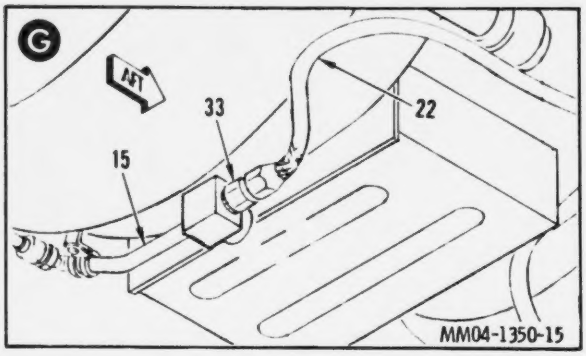
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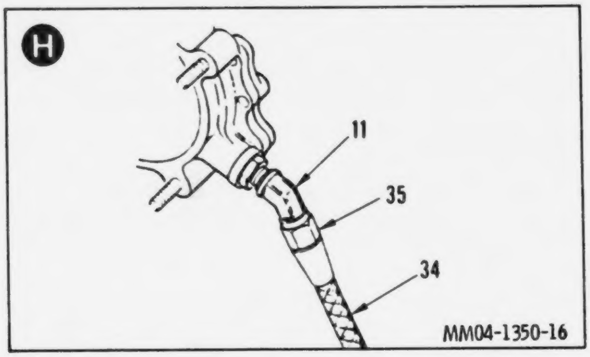
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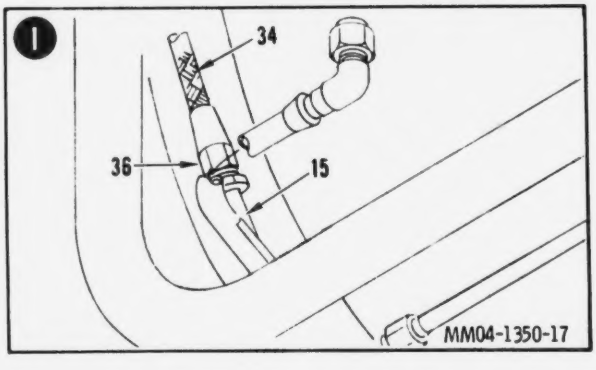
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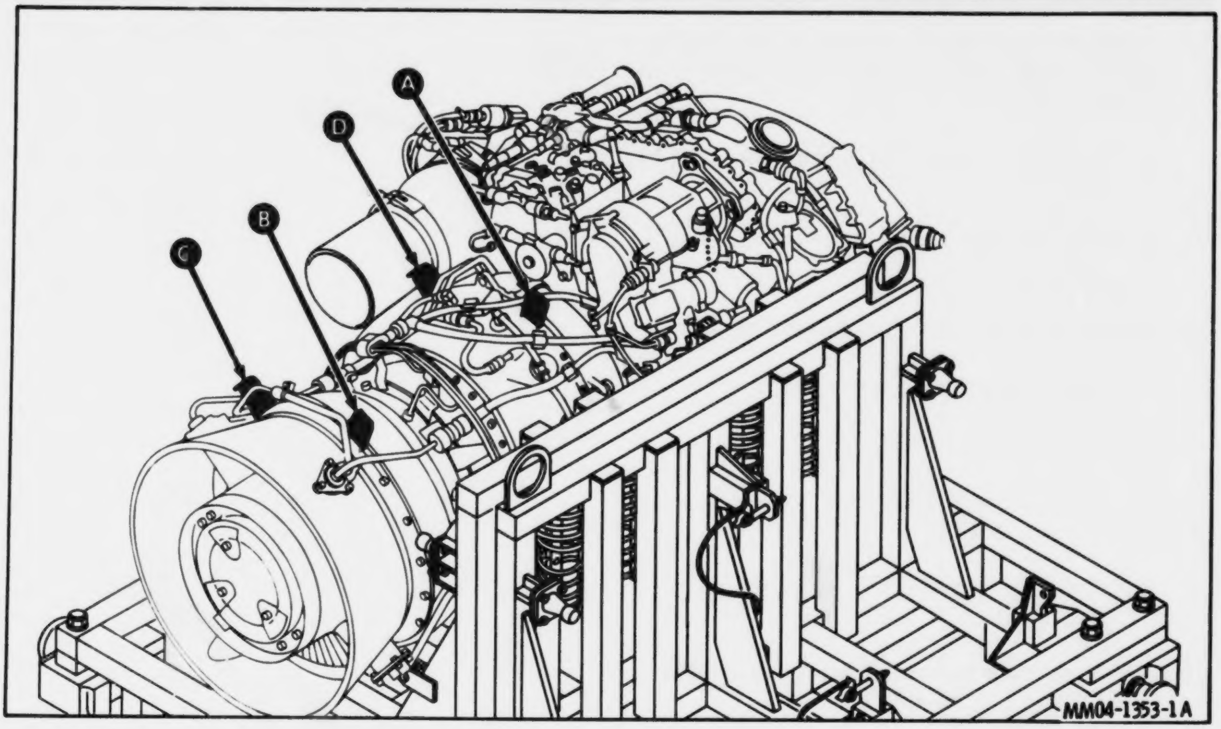
4-2-32. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE SHROUD SUPPORT INSTALLATION 4-2-32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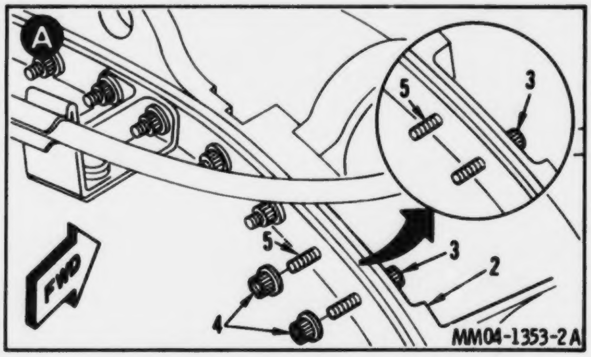
NOTE

This task is typical for No. 1 or No. 2 engine shroud support assembly.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MM04-1353-2A

1. **Install forward right radiation shield support (1) on diffuser case flange (2).**
   a. Hold bolt (3). Remove nut (4).
   b. Remove nut (4) from stud (5).
   c. Lubricate threads of bolt (3) and stud (5). Use oil (E42).

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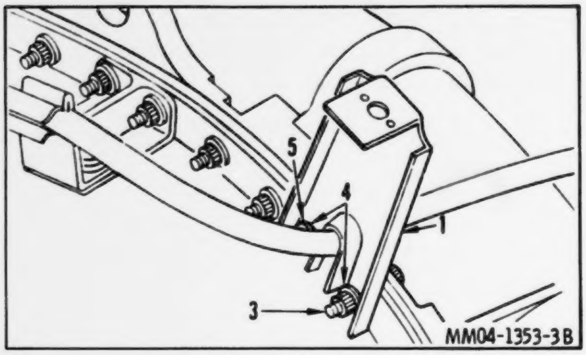
4-2-32. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE SHROUD SUPPORT INSTALLATION (cont) 4-2-32

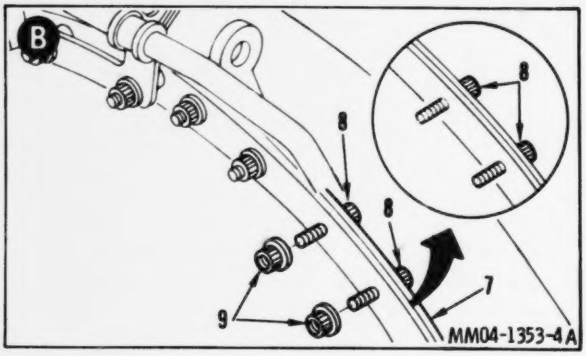


   c. Position support (1) on bolt (3) and stud (5).

   d. Hold bolt (3). Install nut (4).

   e. Install nut (4) on stud (5).

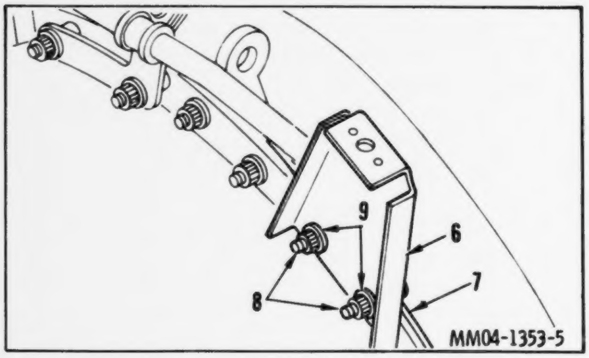
2. **Torque two nuts (4) to 80 INCH-POUNDS.** Hold bolt (3). Torque two nuts (4) to 80 **INCH-POUNDS.** Use 1/4 drive torque wrench.



3. **Install aft right radiation shield support (6) on power turbine case flange (7).**

   a. Hold two bolts (8). Remove two nuts (9).

   b. Lubricate threads of bolts (8). Use oil (E42).



   c. Position support (6) on bolts (8).

   d. Hold bolts (8). Install nuts (9).

4. **Torque two nuts (9) to 80 INCH-POUNDS.** Hold two bolts (8). Torque two nuts (9) to 80 **INCH-POUNDS.** Use 1/4 drive torque wrench.

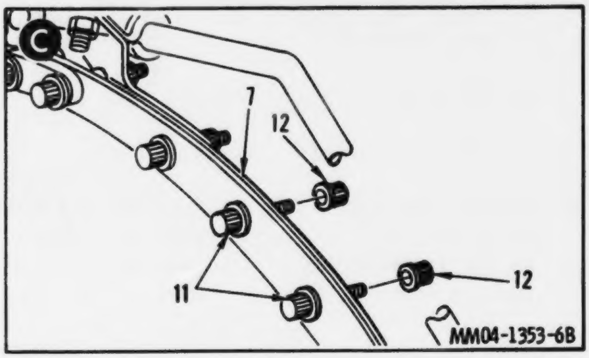
GO TO NEXT PAGE

4-2-32. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE SHROUD SUPPORT INSTALLATION (cont) 4-2-32

5. Install aft left radiation shield support (10) on power turbine case flange (7).

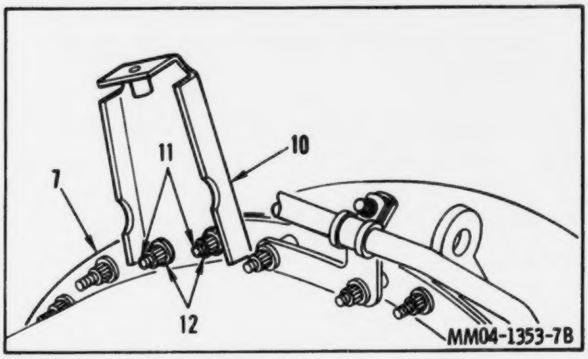
a. Hold two bolts (11). Remove nuts (12).

b. Lubricate threads of bolts (11). Use oil (E42).



c. Position support (10) on bolts (11).

d. Hold two bolts (11). Install two nuts (12).



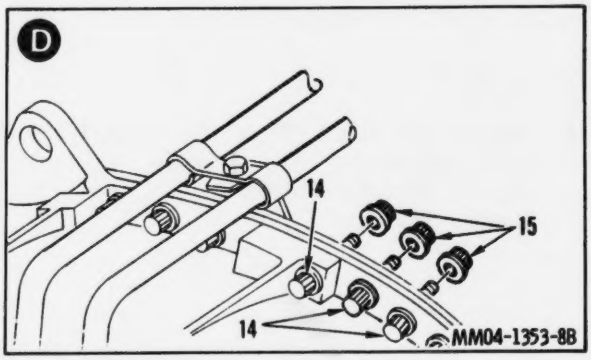
6. Torque two nuts (12) to 80 INCH-POUNDS. Hold two bolts (11) and torque two nuts (12) to **80 INCH-POUNDS.** Use 1/4 drive torque wrench.

7. Install forward left radiation shield support (13) on diffuser case flange (2).

a. Hold bolts (14). Remove nuts (15).

b. Lubricate threads of bolts (14). Use oil (E42).

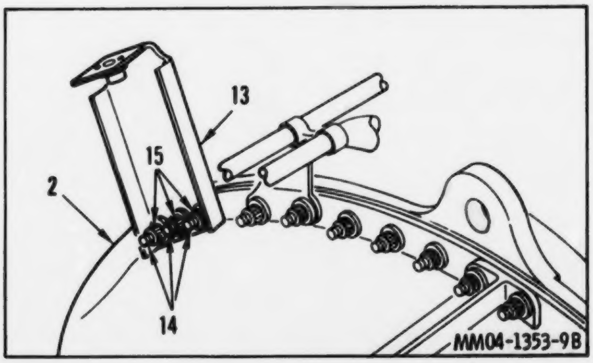
c. Position support (13) on bolts (14).



8. Torque nut (15) to 80 INCH-POUNDS.

Hold bolts (14). Torque nuts (15) to **80 INCH-POUNDS.** Use 1/4 drive torque wrench.

9. Inspect (TI).



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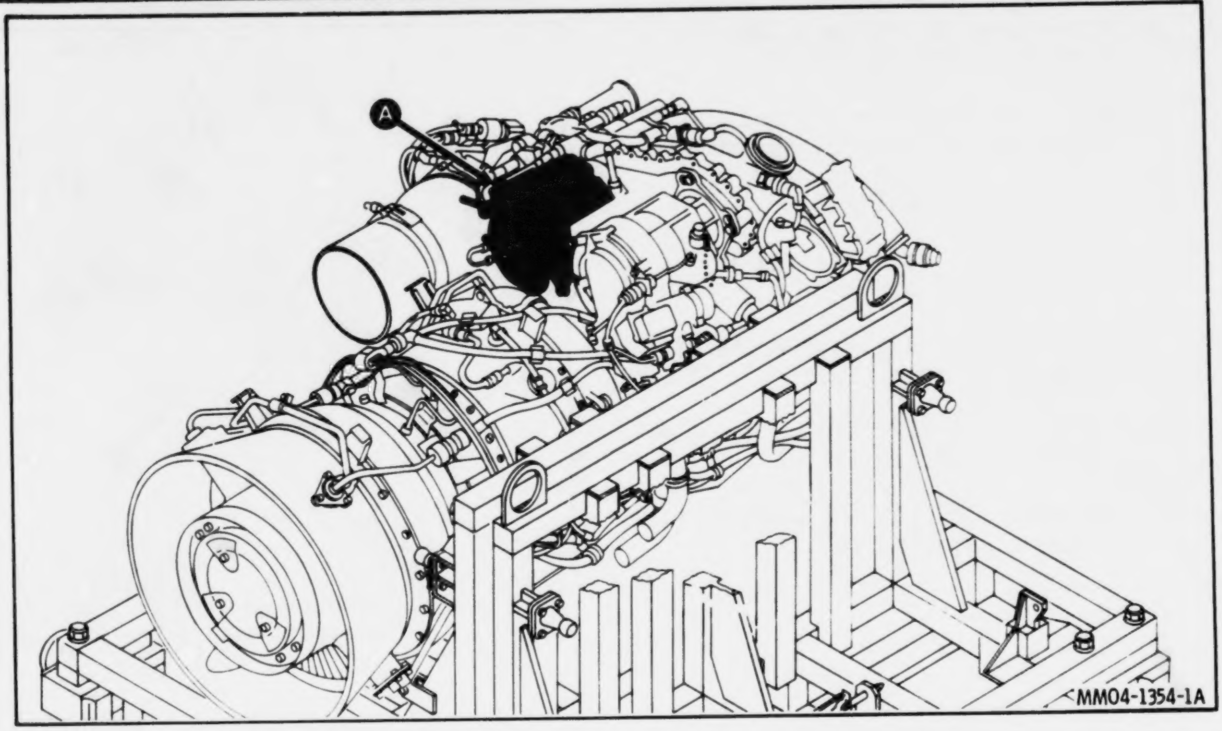
4-2-33. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE BASEPLATE AND SPINDLE GEARBOXES INSTALLATION 4-2-33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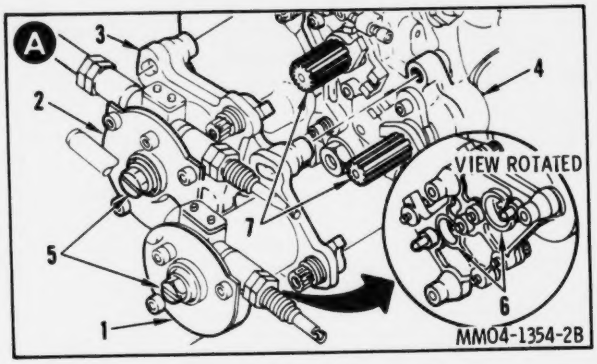
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NOTE

This task is typical for No. 1 or No. 2 engine baseplate and gearbox.

1. **Install load demand spindle gearbox (1), power available spindle gearbox (2), and baseplate (3) on hydromechanical unit (HMU) (4).**

   a. Rotate wide tooth spaces (6) to aline with HMU (4) wide tooth spaces (7). Use common screwdriver in slots (5) on gearboxes (1) and (2).

GO TO NEXT PAGE

4-2-33. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE BASEPLATE AND SPINDLE GEARBOXES INSTALLATION (cont) 4-2-33

b. Aline pins (8) on baseplate (3) with holes (9) in HMU (4).

c. Position baseplate (3) and gearboxes (1) and (2) on HMU (4).

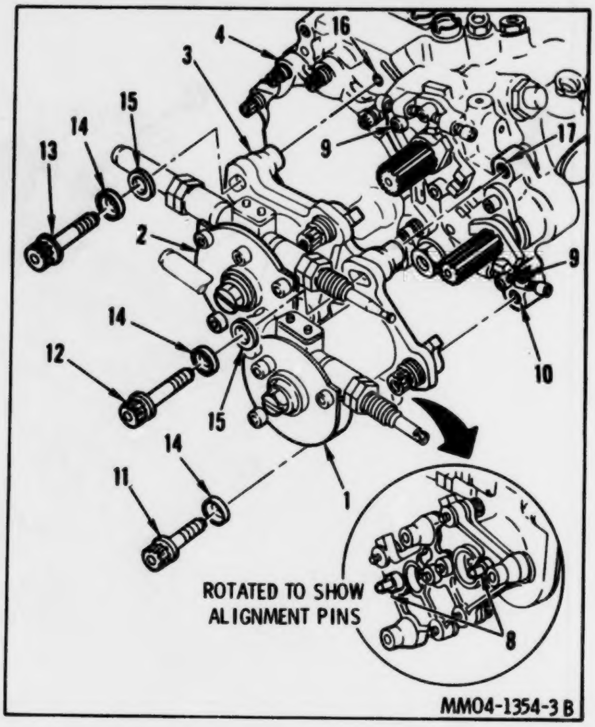
NOTE

Short bolt (11) is installed in mounting hole (10).

d. Install bolt (11), and washer (14) in mounting hole (10).

e. Install bolt (12) and washer (14) in mounting hole (17).

f. Install bolt (13) and washer (14) in mounting hole (16).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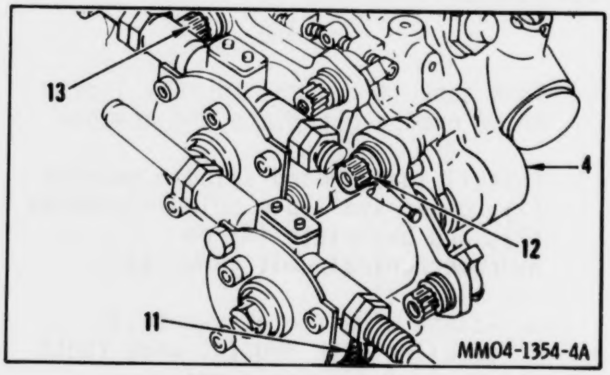
MM04-1354-3 B

2. **Torque three bolts (11), (12), and (13) to 60 INCH-POUNDS.** Use 3/8 drive torque wrench.

3. **Inspect (TI).**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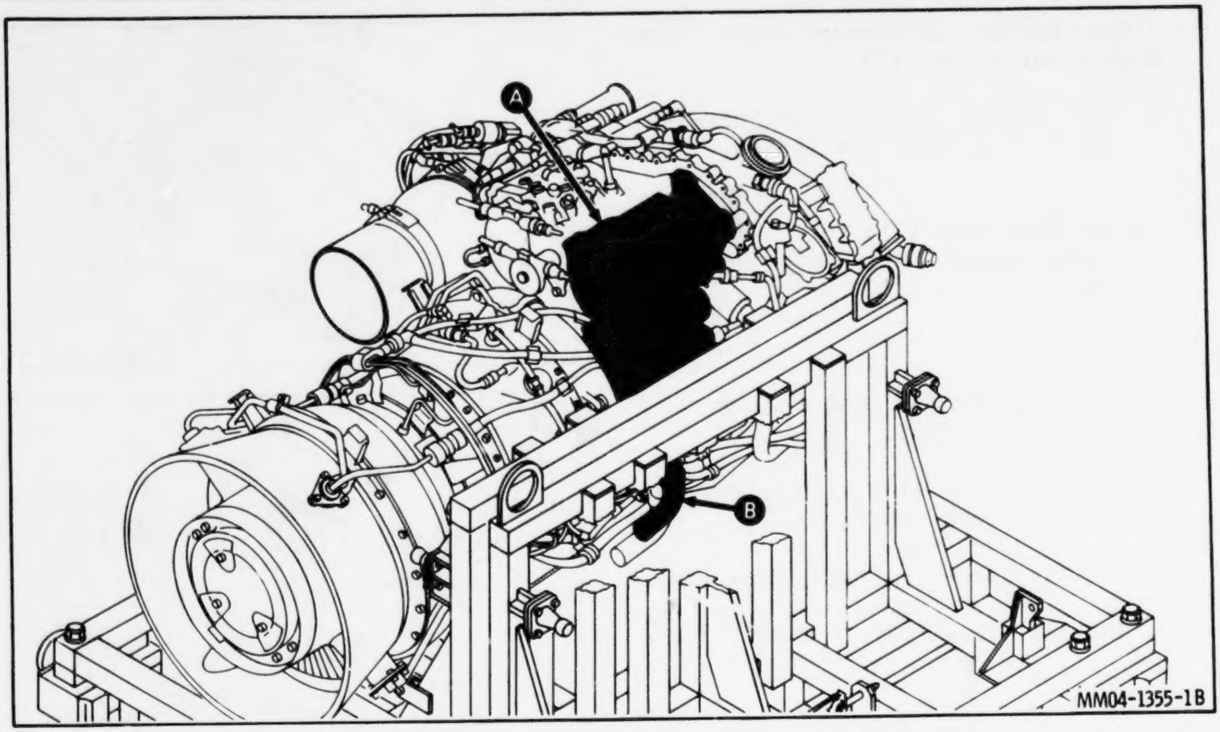
4-2-34. ENGINE BUILDUP - NO. 1 ENGINE AIR STARTER AND REGULATING VALVE INSTALLATION 4-2-34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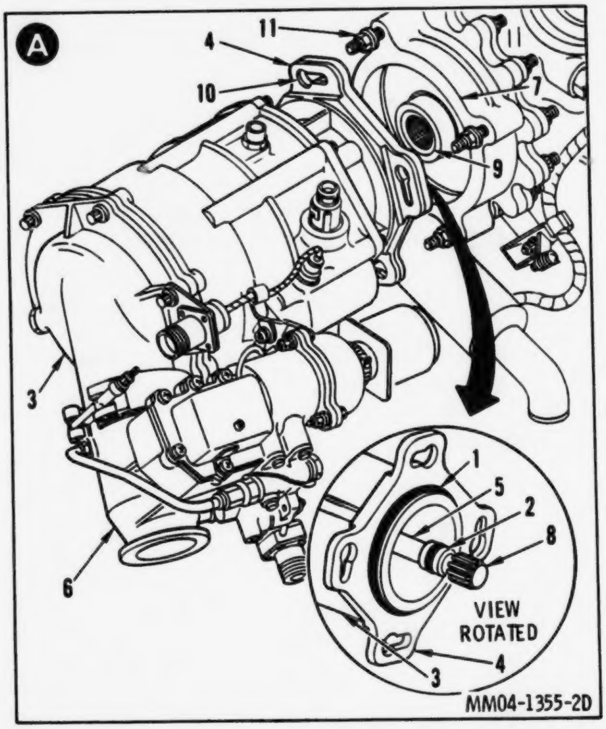
1. **Install two new packings (1) and (2) on starter (3).**
   a. Lubricate new packings (1) and (2). Use petrolatum (E16).
   b. Install new packing (1) on starter flange (4).
   c. Install new packing (2) on starter shaft (5).
2. **Mount starter (3) with regulator valve (6) on mounting pad (7).**
   a. Align starter shaft splines (8) with starter drive pad splines (9).
   b. Align holes (10) on starter flange (4) with four nuts (11) on mounting pad (7).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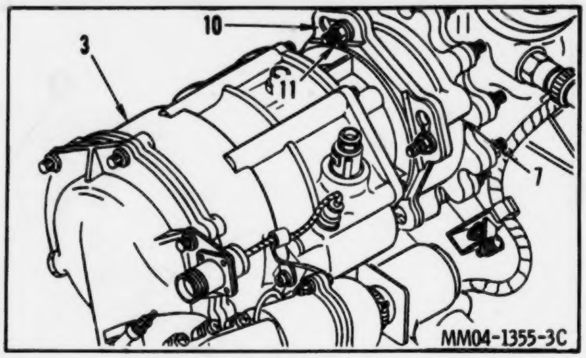
4-2-34. ENGINE BUILDUP - NO. 1 ENGINE AIR STARTER AND REGULATING VALVE INSTALLATION (cont) 4-2-34

3. **Slide starter (3) forward until flush with mounting pad (7).**

   a. Turn starter (3) counterclockwise until slots (10) are seated.

4. **Torque four nuts (11) to 120 INCH-POUNDS.** Use 3/8 drive torque wrench.

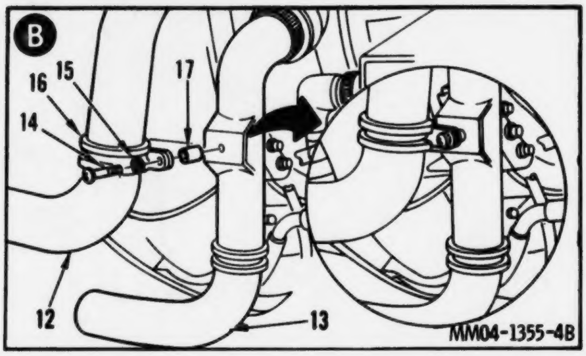


5. **Install starter air tube (12) on bleed air tube (13).**

   a. Install screw (14) with washer (15) through clamp (16).

   b. Install spacer (17) on screw (14).

   c. Install screw (14) in tube (13).

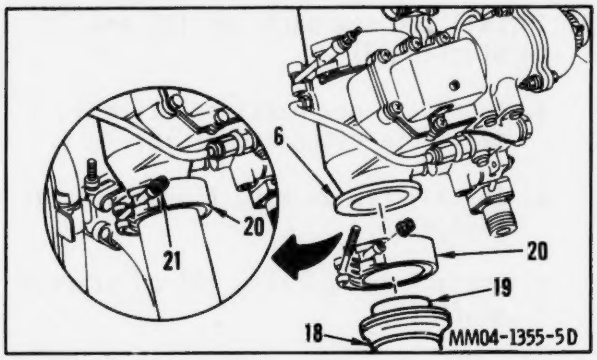


6. **Install starter air tube (18) on regulator valve (6).**

   a. Install insert (19) in starter air tube (18).

   b. Position (20) on air tube (18) and regulator valve (6).

   c. Install nut (21) on coupling (20). Torque coupling nut (21) to **25 INCH-POUNDS.** Use 1/4 drive torque wrench.



7. **Inspect (TI).**

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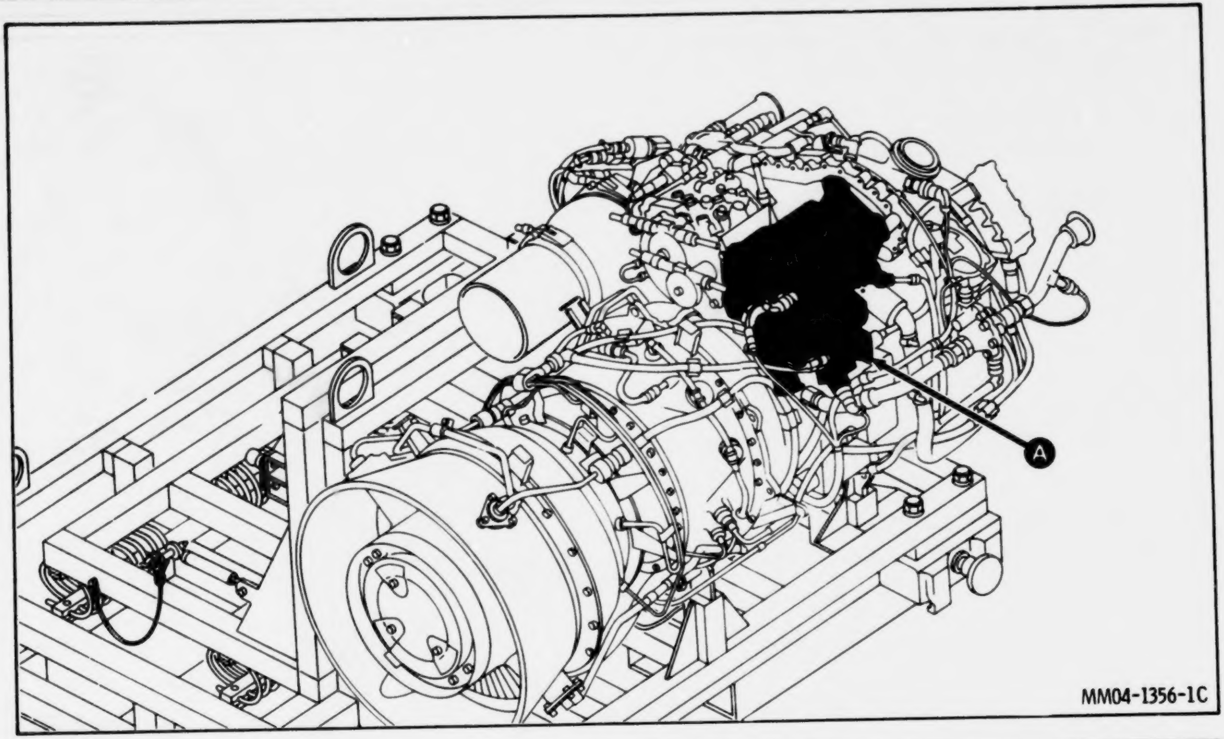
4-2-35. ENGINE BUILDUP - NO. 2 ENGINE AIR STARTER AND REGULATING VALVE INSTALLATION 4-2-35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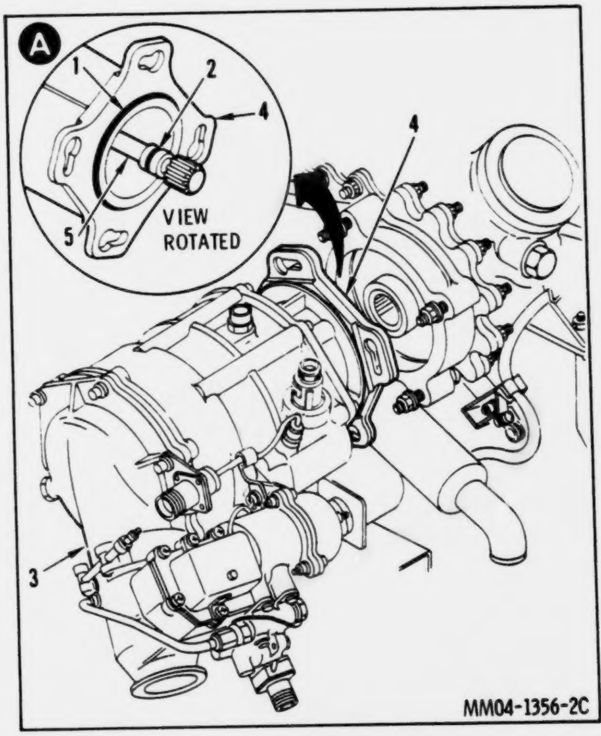
1. Install new packings (1) and (2) on starter (3).
   a. Lubricate new packings (1) and (2). Use petrolatum (E16).
   b. Install new packing (1) on starter flange (4).
   c. Install new packing (2) on starter shaft (5).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4-2-35. ENGINE BUILDUP - NO. 2 ENGINE AIR STARTER AND REGULATING VALVE INSTALLATION (cont) 4-2-35

2. **Mount starter (3) with regulator valve (6) on mounting pad (7).**

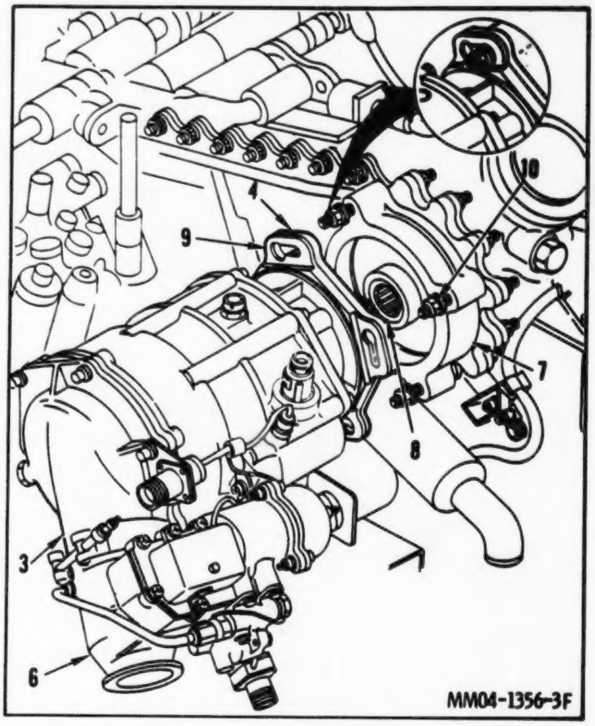
   a. Aline starter shaft splines with starter drive pad splines (8).

   b. Aline holes (9) on starter flange (4) with nuts (10) on mounting pad (7).

   c. Slide starter (3) forward until flush with mounting pad (7).

   d. Turn starter (3) counterclockwise until slots (4) are seated.

3. **Torque four nuts (10) to 120 INCH-POUNDS.** Use 3/8 drive torque wrench.



4. **Install starter air tube (11) on regulator valve (6).**

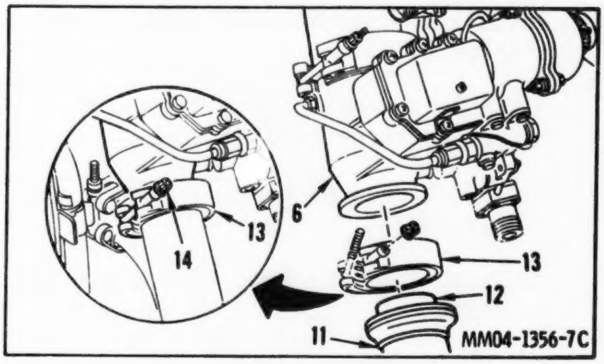
   a. Install insert (12) in starter air tube (11).

   b. Position coupling (13) on starter air tube (11) and regulator valve (6).

   c. Install nut (14) on coupling (13).

5. **Torque coupling nut (14) to 25 INCH-POUNDS.** Use 3/8 drive torque wrench.

6. **Inspect (TI).**



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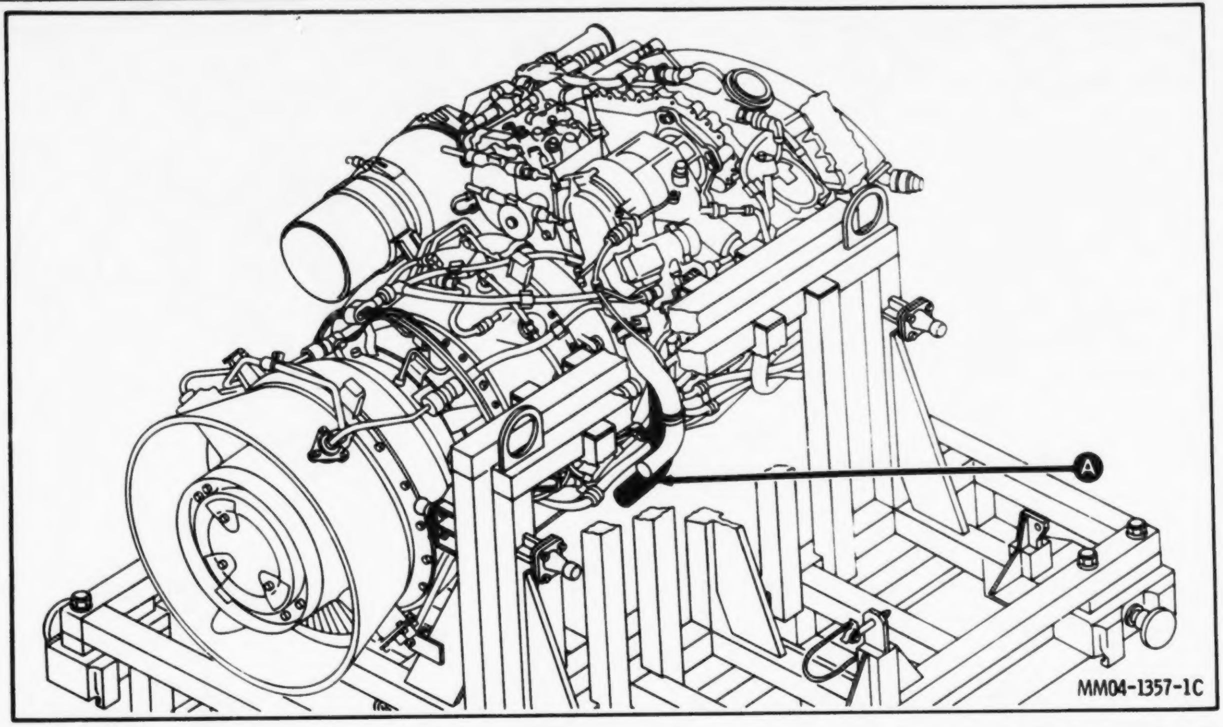
4-2-36. ENGINE BUILDUP - NO. 1 ENGINE ANTI-ICE AND BLEED AIR SYSTEM INSTALLATION 4-2-36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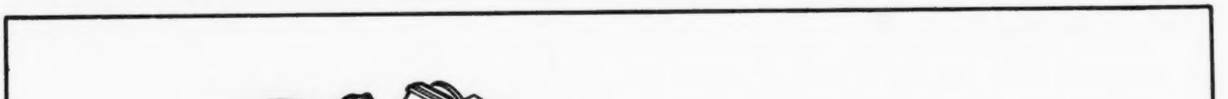
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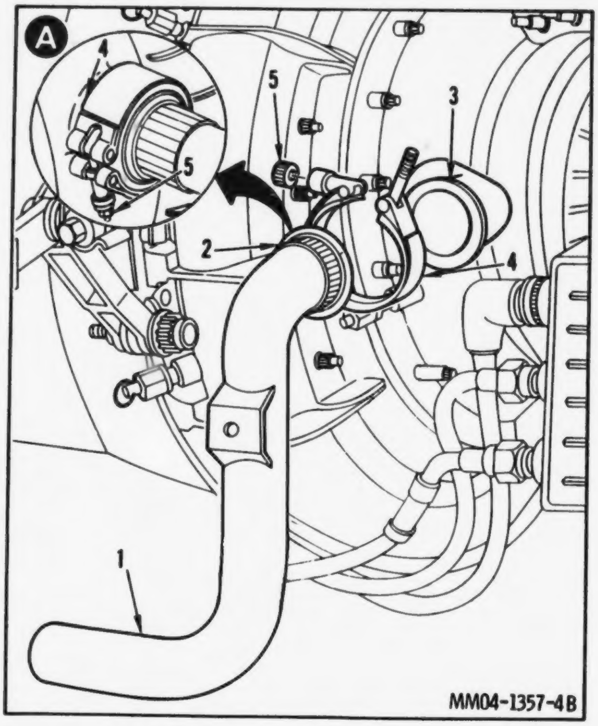
4-2-36. ENGINE BUILDUP - NO. 1 ENGINE ANTI-ICE AND BLEED AIR SYSTEM INSTALLATION (cont) 4-2-36

1. **Install bleed air tube (1).**
   a. Position air tube flange (2) on air port flange (3).
   b. Position coupling (4) around flanges (2) and (3).
   c. Install coupling nut (5).
2. **Torque coupling nut (5) to 25 INCH-POUNDS.** Use 3/8 drive torque wrench.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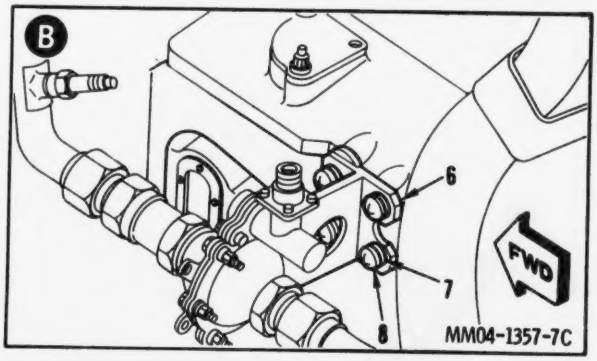
MM04-1357-4B

3. **Install anti-ice valve support bracket (6).** Install four washers (7) and screws (8).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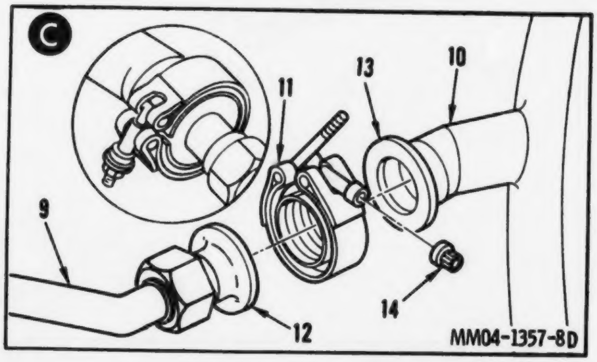
4. **Install anti-ice tube (9) on adapter (10),**
   a. Position coupling (11) around flanges (12) and (13).
   b. Install coupling nut (14).
5. **Torque nut (13) to 25 INCH-POUNDS.** Use 1/4 drive torque wrench.
6. **Inspect (TI).**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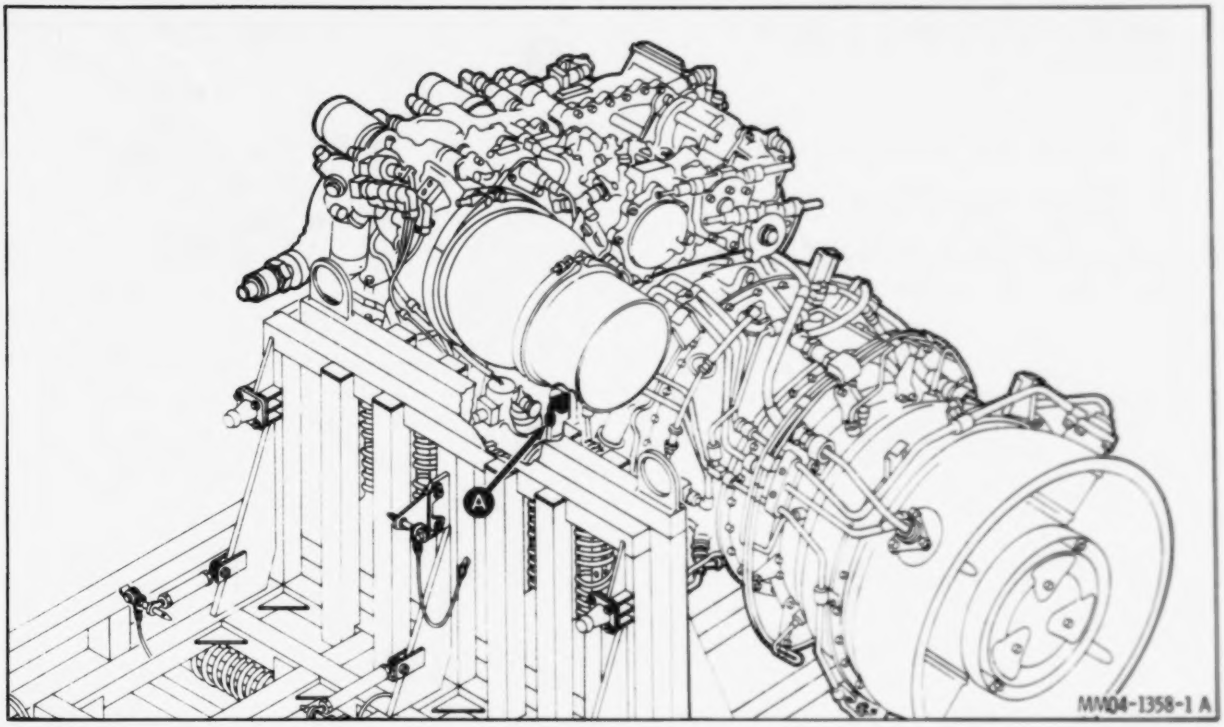
4-2-37. ENGINE BUILDUP - NO. 2 ENGINE ANTI-ICE AND BLEED AIR SYSTEM INSTALLATION 4-2-37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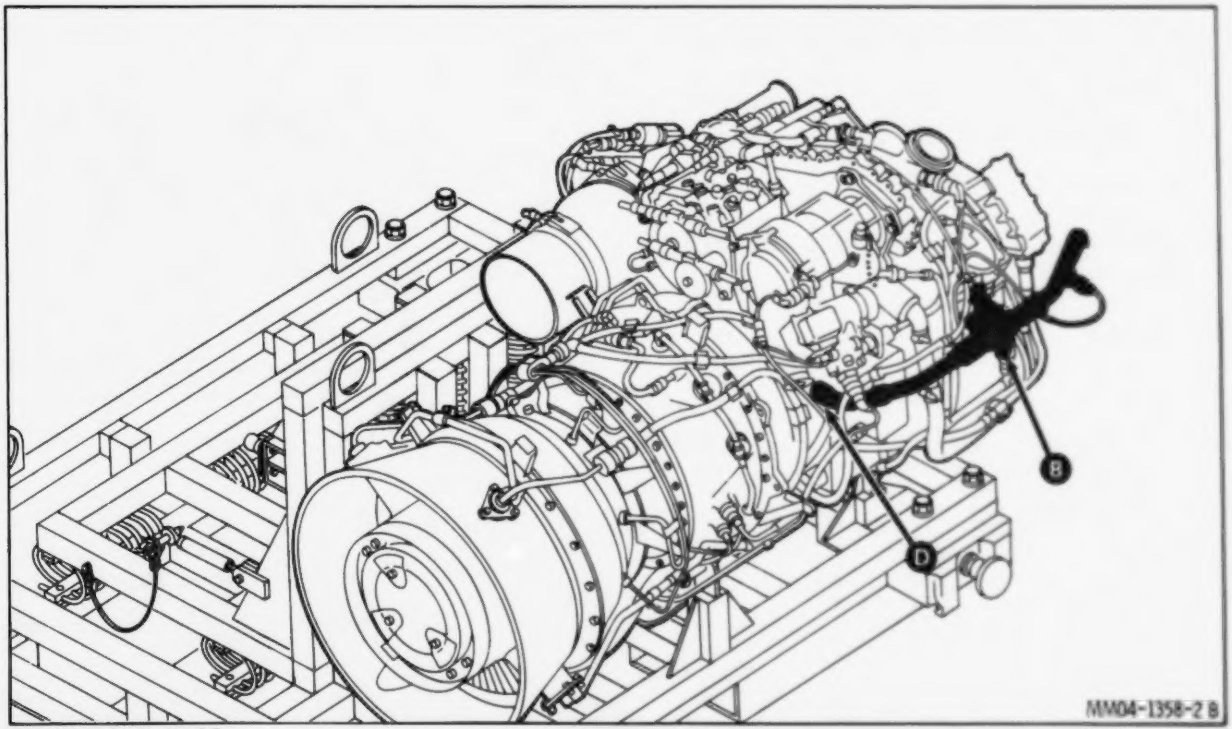
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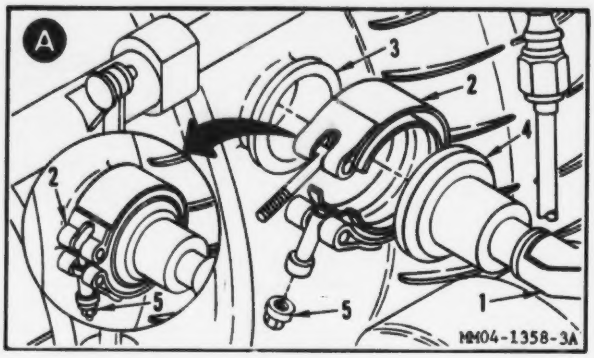
4-2-37. ENGINE BUILDUP - NO. 2 ENGINE ANTI-ICE AND BLEED AIR SYSTEM INSTALLATION (cont) 4-2-37

1. **Install cooling door actuator hose (1).**
    a. Position coupling (2) around adapter (3) and flange (4).
    b. Install coupling nut (5).
2. **Torque nut (5) to 25 INCH-POUNDS.** Use 3/8 drive torque wrench.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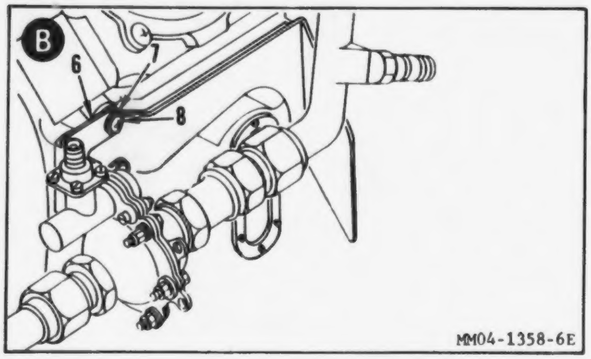
3. **Install valve support (6).** Install washers (7) and four screws (8).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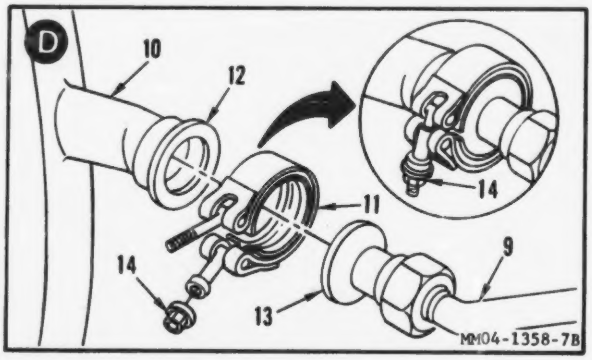
4. **Install tube (9) on adapter (10).**
    a. Position coupling (11) around flanges (12) and (13).
    b. Install coupling nut (14).
5. **Torque nut (14) to 25 INCH-POUNDS.** Use 3/8 drive torque wrench.
6. **Inspect (TI).**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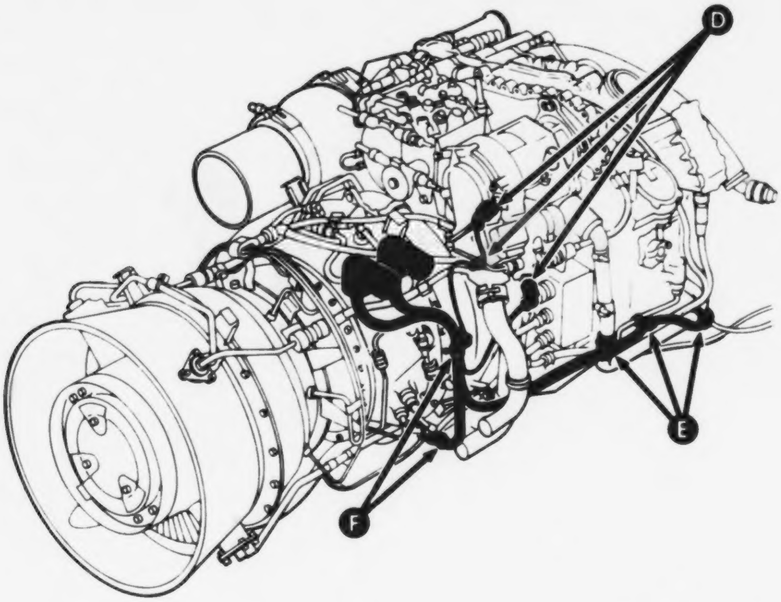
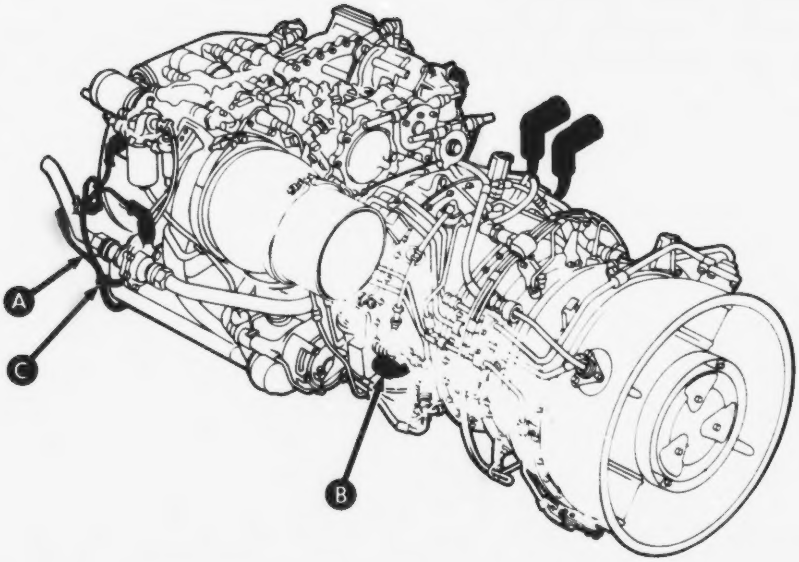
4-2-38. ENGINE BUILDUP - NO. 1 ENGINE WIRING INSTALLATION 4-2-38





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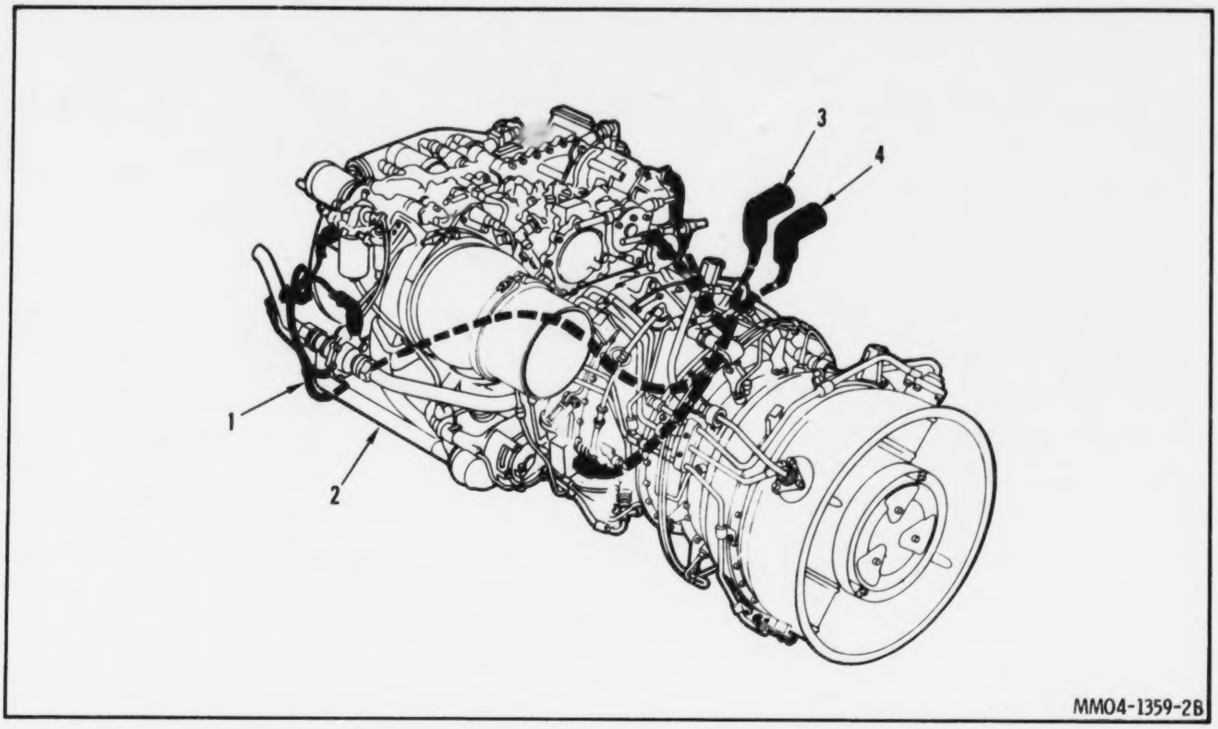
4-2-38. ENGINE BUILDUP - NO. 1 ENGINE WIRING INSTALLATION (cont) 4-3-38



1. Place wire harness (1) under front of engine (2) with firewall connectors P21 (3) and P23 (4) on right side of engine (2).

GO TO NEXT PAGE

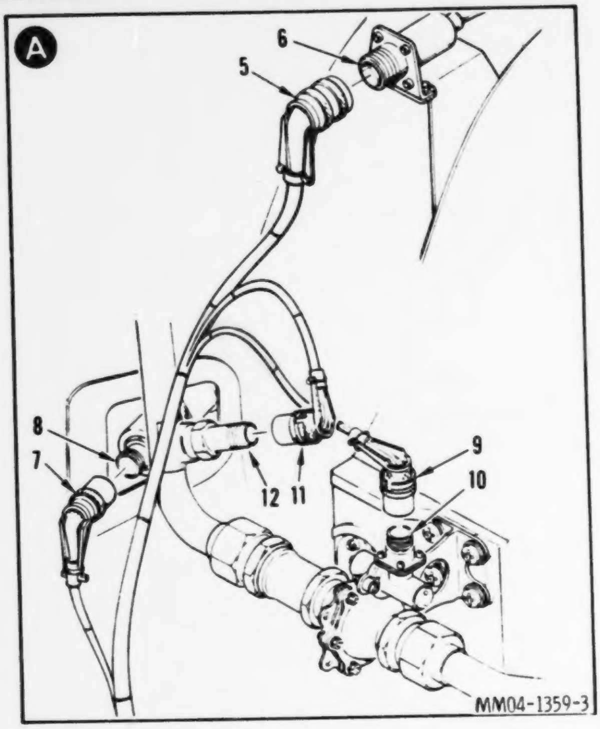
4-2-38. ENGINE BUILDUP - NO. 1 ENGINE WIRING INSTALLATION (cont) 4-2-38

2. Attach connector P45 (5) to engine instruments connector E3 (6).

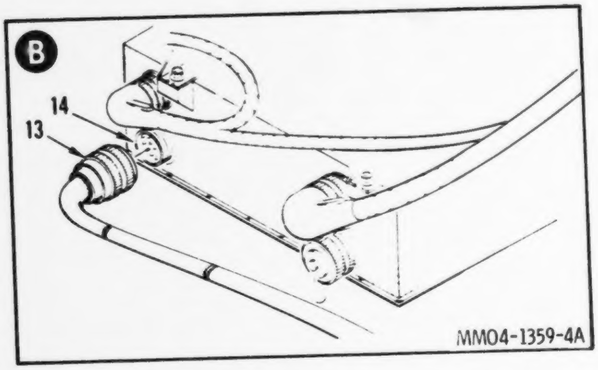
3. Attach connector P25 (7) to ice detector connector J1 (8).

4. Attach connector P33 (9) to anti-ice valve connector L1 (10).

5. Attach connector P954 (11) to anti-ice temperature switch connector S127 (12).



6. Attach connector P41 (13) to electrical control unit E1 (14).



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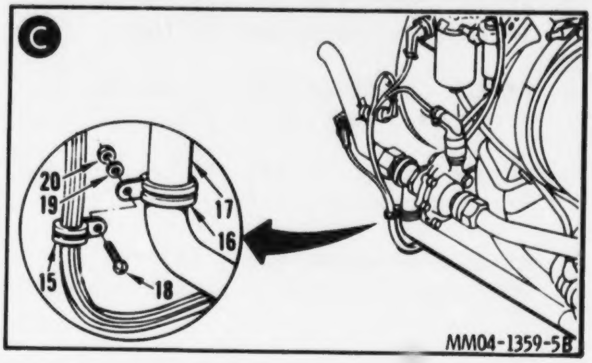
4-2-38. ENGINE BUILDUP - NO. 1 ENGINE WIRING INSTALLATION (cont) 4-2-38

7. **Install wire harness support clamps (15) and (16) on bleed duct (17).**

   a. Insert screw (18) into clamps (15) and (16).

   b. Hold screw (18). Install washer (19) and nut (20).



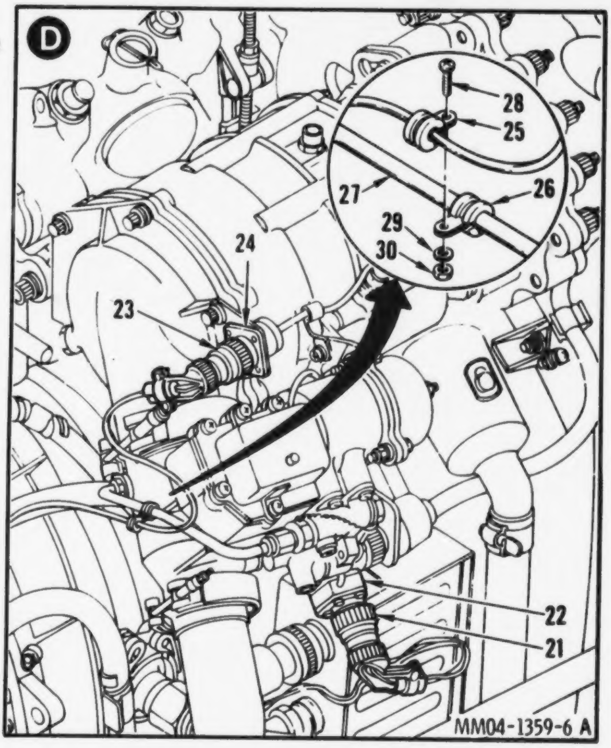
8. **Attach connector P39 (21) to starter regulator connector L3 (22).** Lockwire connector (21) to connector (22). Use lockwire (E34).

9. **Attach connector P35 (23) to starter connector A3 (24).** Lockwire connector (23) to connector (24). Use lockwire (E34).

10. **Install wire harness support clamps (25) and (26) on engine regulator valve tube (27).**

    a. Insert screw (28) into clamps (25) and (26).

    b. Hold screw (28). Install washer (29) and nut (30).



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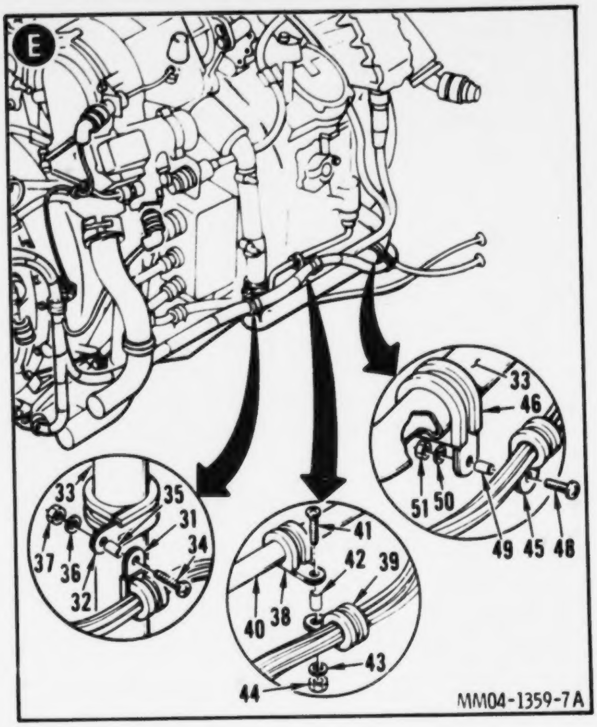
4-2-38. ENGINE BUILDUP - NO. 1 ENGINE WIRING INSTALLATION (cont) 4-2-38



11. **Install wire harness support clamps (31) and (32) on sensing tube (33).**

    a. Insert screw (34) through clamp (31), spacer (35), and clamp (32).

    b. Hold screw (34). Install washer (36) and nut (37).

12. **Install wire harness support clamps (38) and (39) on drain manifold (40).**

    a. Insert screw (41) through clamp (38), spacer (42) and clamp (39).

    b. Hold screw (41). Install washer (43) and nut (44).

13. **Install wire harness support clamps (45) and (46) on sensing tube (33).**

    a. Insert screw (48) through clamp (45), spacer (49), clamp (46).

    b. Hold screw (48). Install washer (50) and nut (51).

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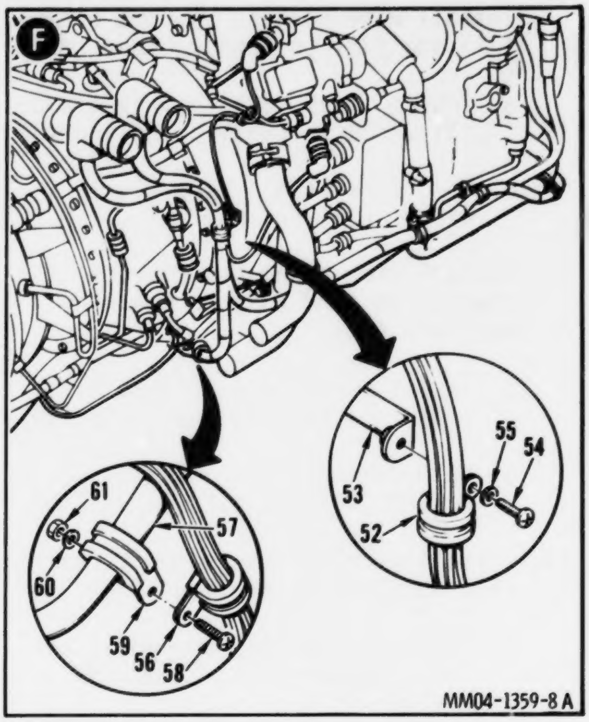
4-2-38. ENGINE BUILDUP - NO. 1 ENGINE WIRING INSTALLATION (cont) 4-2-38



14. **Install wire harness support clamp (52) on engine clip (53).** Install screw (54) through washer (55), clamp (52), and clip (53).

15. **Install wire harness support clamp (56) on C-sump seal pressure tube (57).**

    a. Insert screw (58) through clamps (56) and (59).

    b. Hold screw (58). Install washer (60) and nut (61).

16. **Inspect (TI).**

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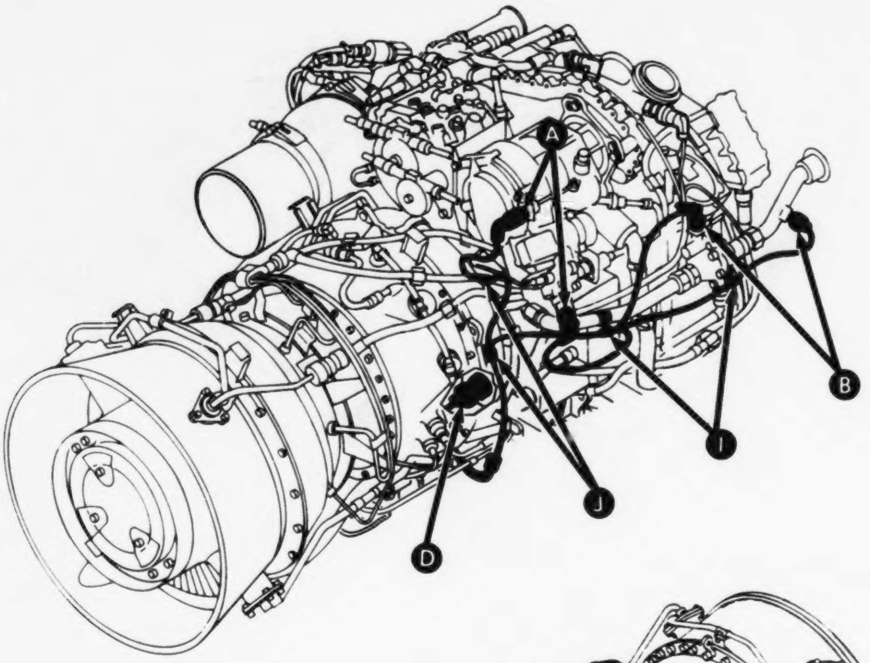
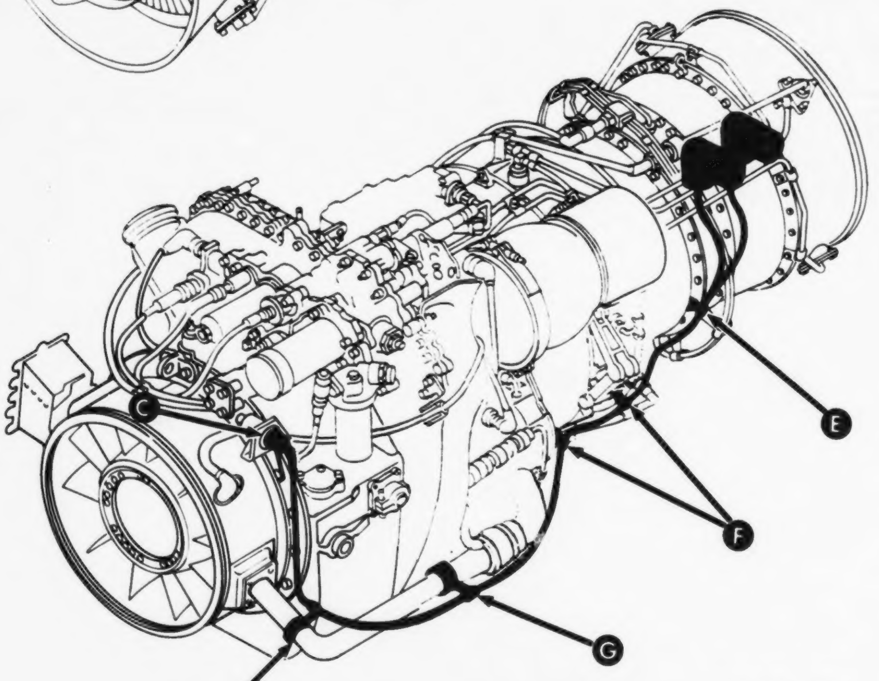
4-2-39. ENGINE BUILDUP - NO. 2 ENGINE WIRING INSTALLATION 4-2-39





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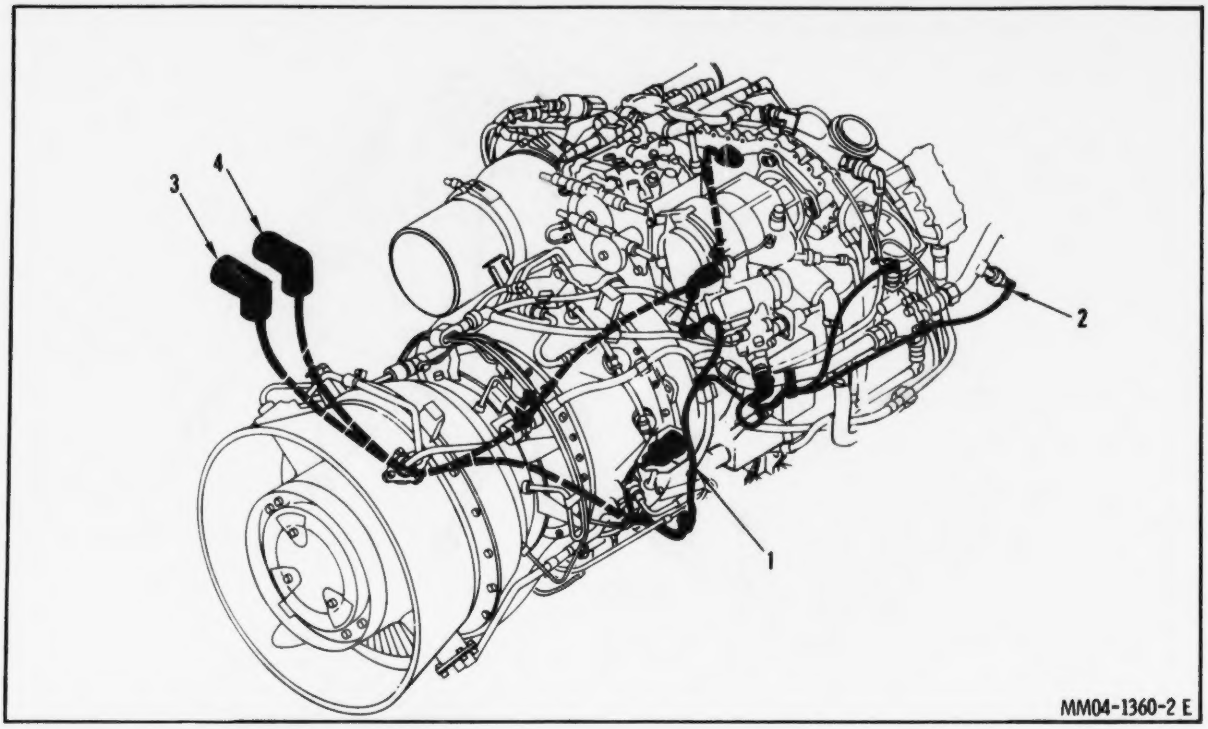
4-2-39. ENGINE BUILDUP - NO. 2 ENGINE WIRING INSTALLATION (cont) 4-2-39



1. Place wire harness (1) under engine (2) with firewall connectors P22 (3) and P24 (4) on left side of engine (2).

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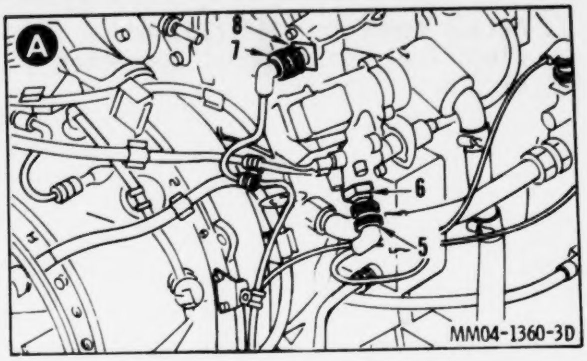
4-2-39. ENGINE BUILDUP - NO. 2 ENGINE WIRING INSTALLATION (cont) 4-2-39

2. Attach connector P40 (5) to air regulator valve connector L4 (6).
3. Attach connector P36 (7) to starter connector A4 (8).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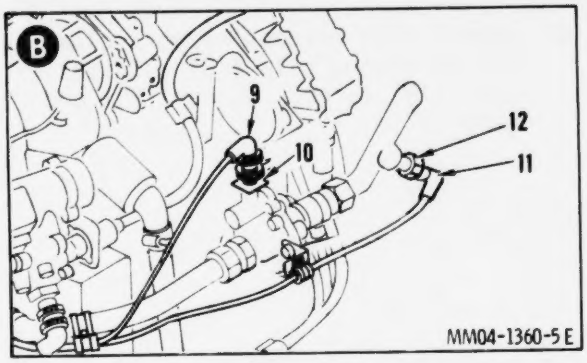
MM04-1360-3D

4. Attach connector P34 (9) to anti-ice valve connector L2 (10).
5. Attach connector P953 (11) to temperature switch connector S126 (12).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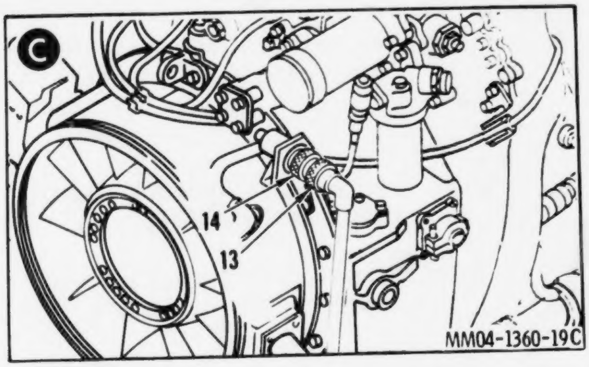
6. Attach connector P46 (13) to airframe monitoring connector E3 (14).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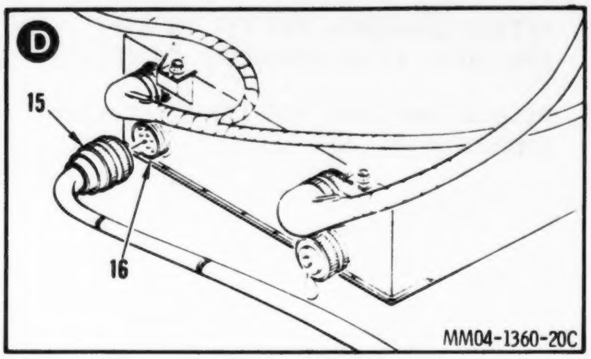
4-2-39. ENGINE BUILDUP - NO. 2 ENGINE WIRING INSTALLATION (cont) 4-2-39

7. **Attach connector P42 (15) to electrical control unit connector E1 (16).**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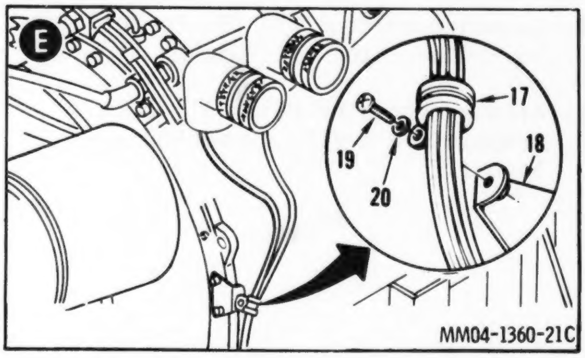
8. **Install wire harness support clamp (17) on engine clip (18).** Install screw (19) through washer (20) and clamp (17).


E
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MM04-1360-21C

9. **Install wire harness support clamp (21) on engine clip (22).** Install screw (23) through washer (24) and clamp (21).

10. **Install wire harness support clamp (25) on drain manifold (27).**

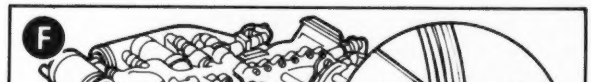
    a. Insert screw (28) through clamp (25), spacer (29), and clamp (26).

    b. Hold screw (28). Install washer (30) and nut (31).

11. **Install wire harness support clamps (32) and (33) on drain manifold (27).**

    a. Insert screw (34) through clamps (32) and (33).

    b. Hold screw (34). Install washer (35) and nut (36).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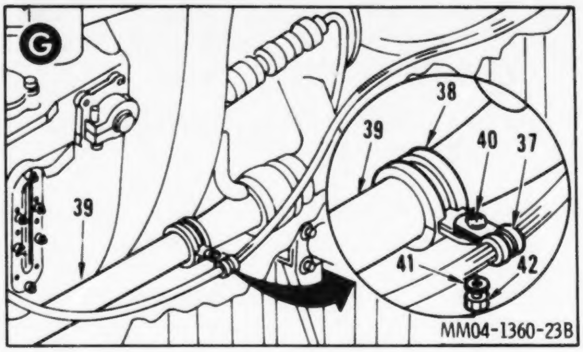
4-2-39. ENGINE BUILDUP - NO. 2 ENGINE WIRING INSTALLATION (cont) 4-2-39

12. **Install wire harness support clamps (37) and (38) on anti-ice tube (39).**

    a. Insert screw (40) through clamps (37) and (38).

    b. Hold screw (40). Install washer (41) and nut (42).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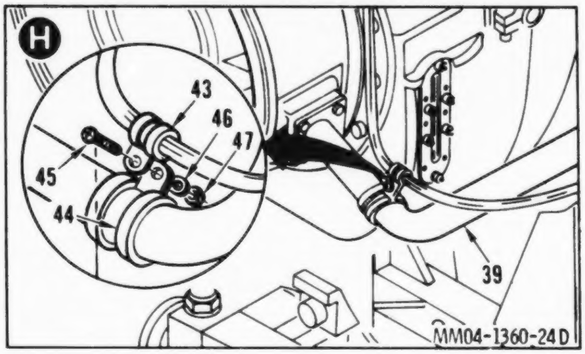
MM04-1360-23B

13. **Install wire harness support clamps (43) and (44) on anti-ice tube (39).**

    a. Insert screw (45) through clamps (43) and (44).

    b. Hold screw (45). Install washer (46) and nut (47).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14. **Install wire harness support clamp (48) on anti-ice valve (49).**

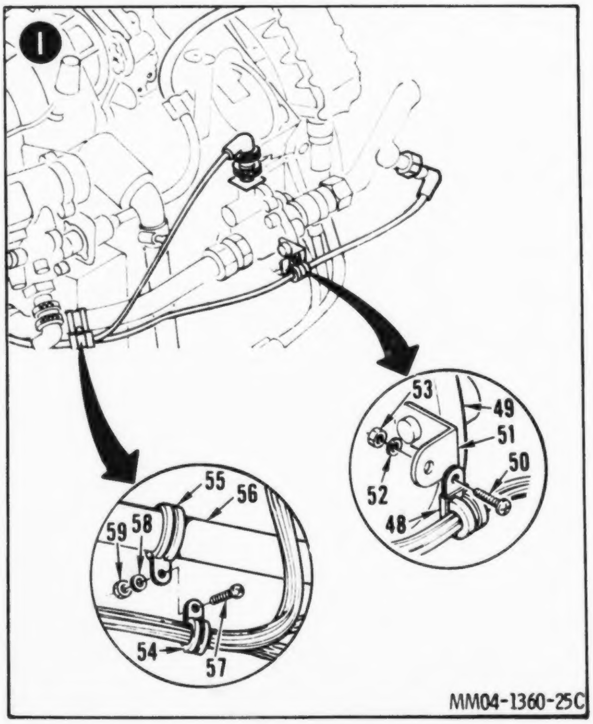
    a. Insert screw (50) through clamp (48) and anti-ice valve clip (51).

    b. Hold screw (50). Install washer (52) and nut (53).

15. **Install wire harness support clamps (54) and (55) on anti-ice tube (56).**

    a. Insert screw (57) through clamps (54) and (55).

    b. Hold screw (57). Install washer (58) and nut (59).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4-2-39. ENGINE BUILDUP - NO. 2 ENGINE WIRING INSTALLATION (cont) 4-2-39

16. **Install wire harness support clamps (60) and (61) on engine regulator valve tube (62).**

    a. Insert screw (63) through clamps (60) and (61).

    b. Hold screw (63). Install washer (64) and nut (65).

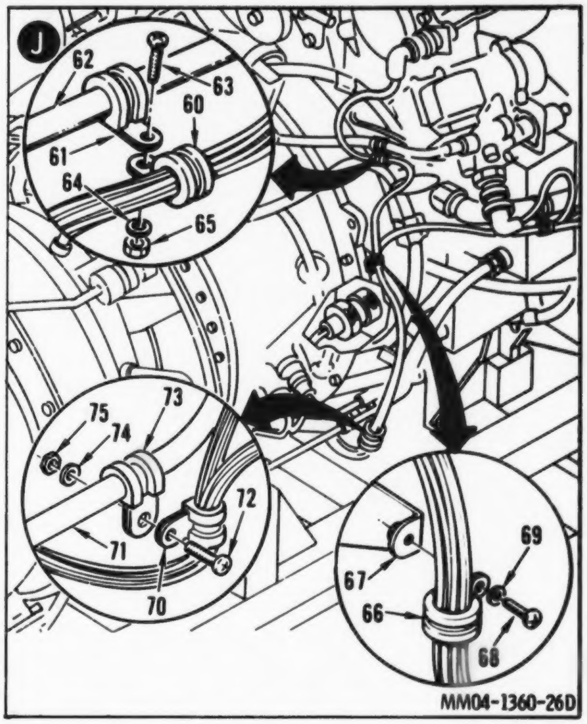
17. **Install wire harness support clamp (66) on engine clip (67).** Install screw (68) through washer (69) and clamp (66).

18. **Install wire harness support clamp (70) on overspeed sensor tube (71).**

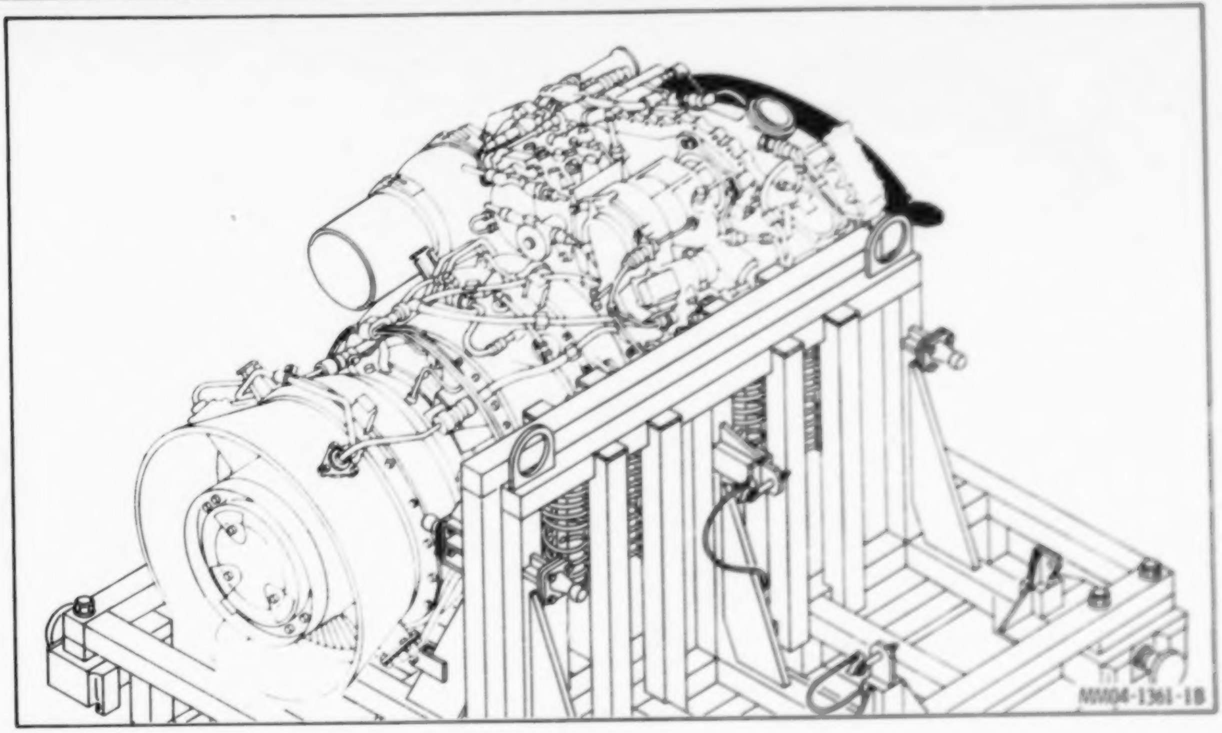
    a. Insert screw (72) through clamps (70) and (73).

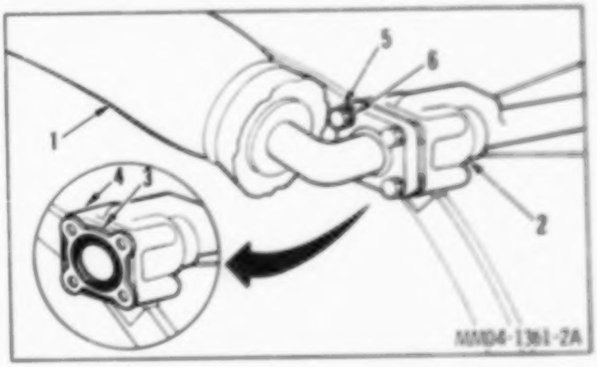
    b. Hold screw (72). Install washer (74) and nut (75).

19. **Inspect (TI).**



4-2-40. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE FUEL INLET INSTALLATION 4-2-40





NOTE

This task is typical for No. 1 or No. 2 engine fuel inlet hose.

1. **Install fuel inlet hose (1) on fuel boost pump (2).**
   - a. Install new seal (3) on pump mounting flange (4).
   - b. Position inlet hose (1) on pump mounting flange (4).
   - c. Install four washers (6) and bolts (5). Torque four bolts (5) to 13 **INCH-POUNDS**. Use 3/8 drive torque wrench.
2. **Inspect (TI).**

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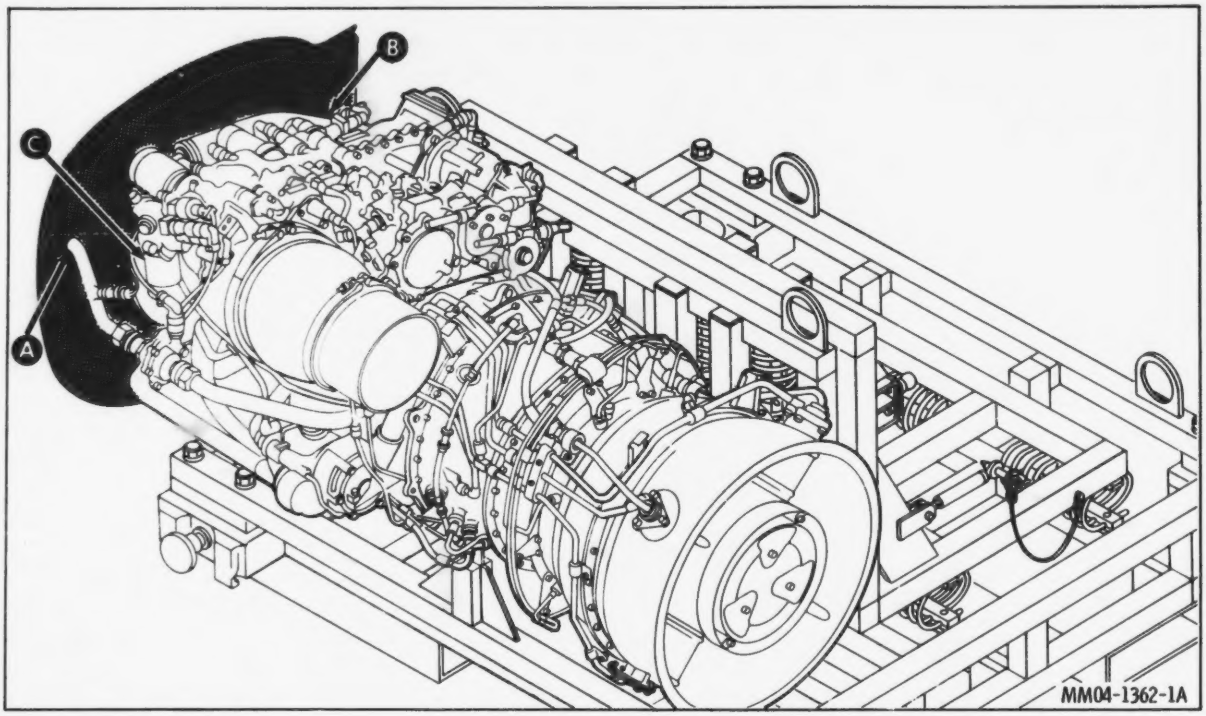
4-2-41. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE AIR INLET INSTALLATION 4-2-41



NOTE

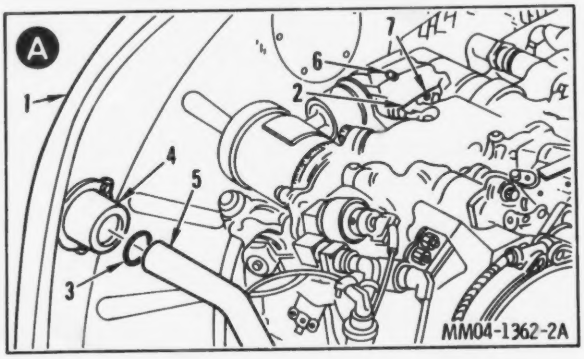
This task is typical for No. 1 or No. 2 engine air inlet.

1. **Install air inlet (1) on engine inlet (2).**

   a. Insert new packing (3) in support (4).

   b. Position inlet (1) with support (4) in line with anti-ice air tube (5).

   c. Insert alining pin (6) at top of fairing (1) in hole (7) on engine inlet (2).



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4-2-41. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE AIR INLET INSTALLATION (cont) 4-2-41

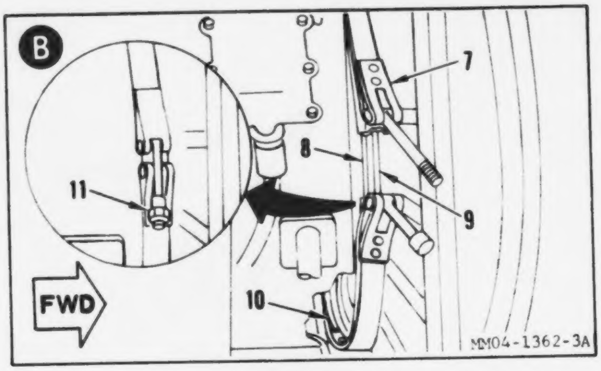
d. Open coupling (7). Place coupling (7) around inlet flange (8) and fairing flange (9).

e. Position coupling (7) with drain cutout (10) on bottom.

f. Install nut (11).

2. **Torque coupling nuts (11) and (12) alternately to 25 INCH-POUNDS.** Use 3/8 drive torque wrench.

3. **Inspect (TI).**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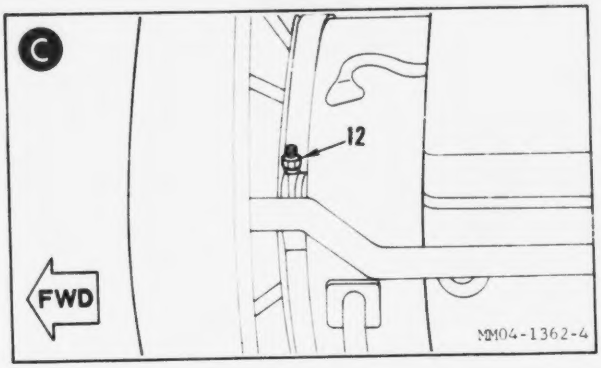
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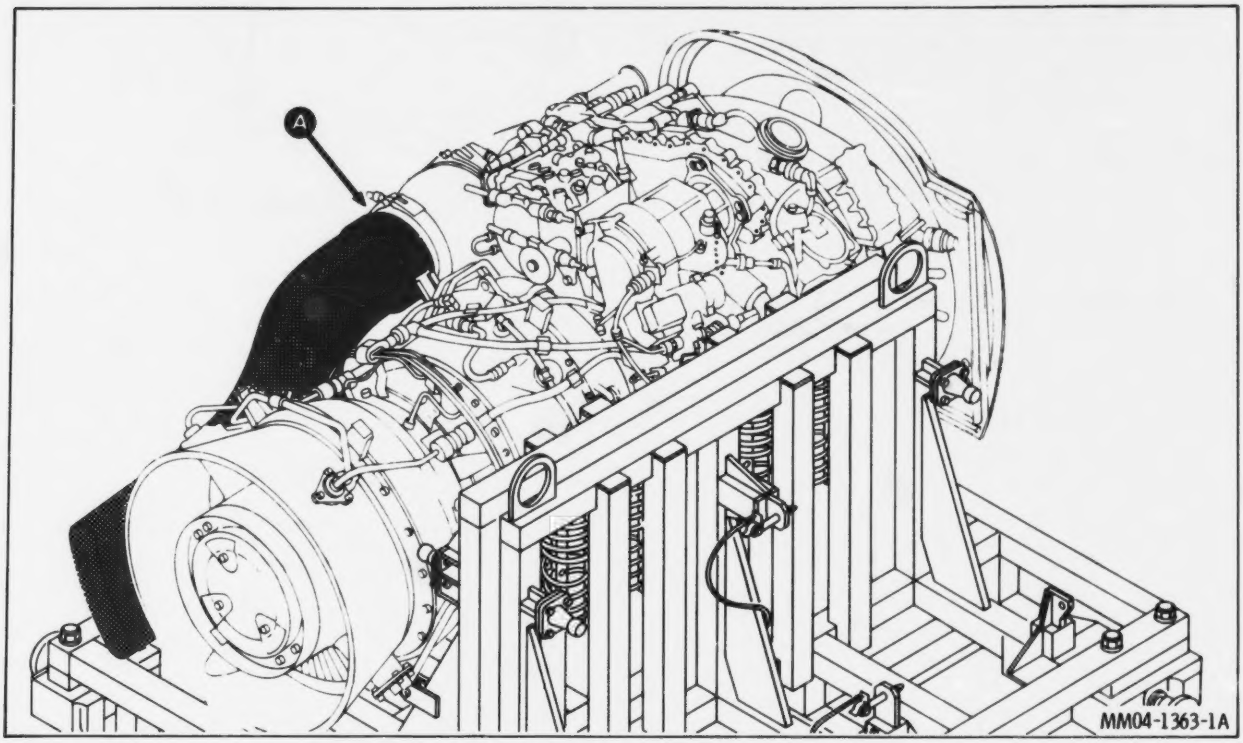
4-2-42. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE AIR DUCT INSTALLATION 4-2-42



NOTE

This task is typical for No. 1 and No. 2 engine air duct.

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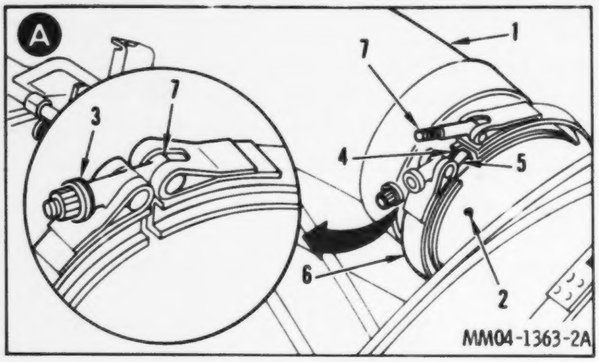
4-2-42. ENGINE BUILDUP - NO. 1 AND NO. 2 ENGINE AIR DUCT INSTALLATION (cont) 4-2-42



1. **Install air duct (1) on particle separator blower (2).** Torque coupling nut (3) to **25 INCH-POUNDS.**
   a. Position adapter flange (4) on particle separator blower flange (5).
   b. Position coupling (6) around flanges (4) and (5), with tee bolt (7) at top facing inboard.
   c. Install coupling nut (3) on tee bolt (7).
   d. Torque coupling nut (3) to **25 INCH-POUNDS.** Use 3/8 drive torque wrench.
2. **Inspect (TI).**

END OF TASK

4-2-43. NO. 1 ENGINE INSTALLATION 4-2-43

This task covers:

4-2-44. No. 1 Engine Installation - Install in Nacelle
4-2-45. No. 1 Engine Installation - Lower Connections
4-2-46. No. 1 Engine Installation - Upper Connections

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Crowfoot Attachment, 9/16, 1/4 Drive	5120-00-541-4074
Kit, Aircraft Adapter	1730-01-240-6743
Sling, Engine	4290-01-108-3484

Materials/Parts:

	Seal (2)
	Packing (4)
(E120)	Compound, Sealing

Personnel Required:

67R10	Attack Helicopter Repairer (3) One to assist
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

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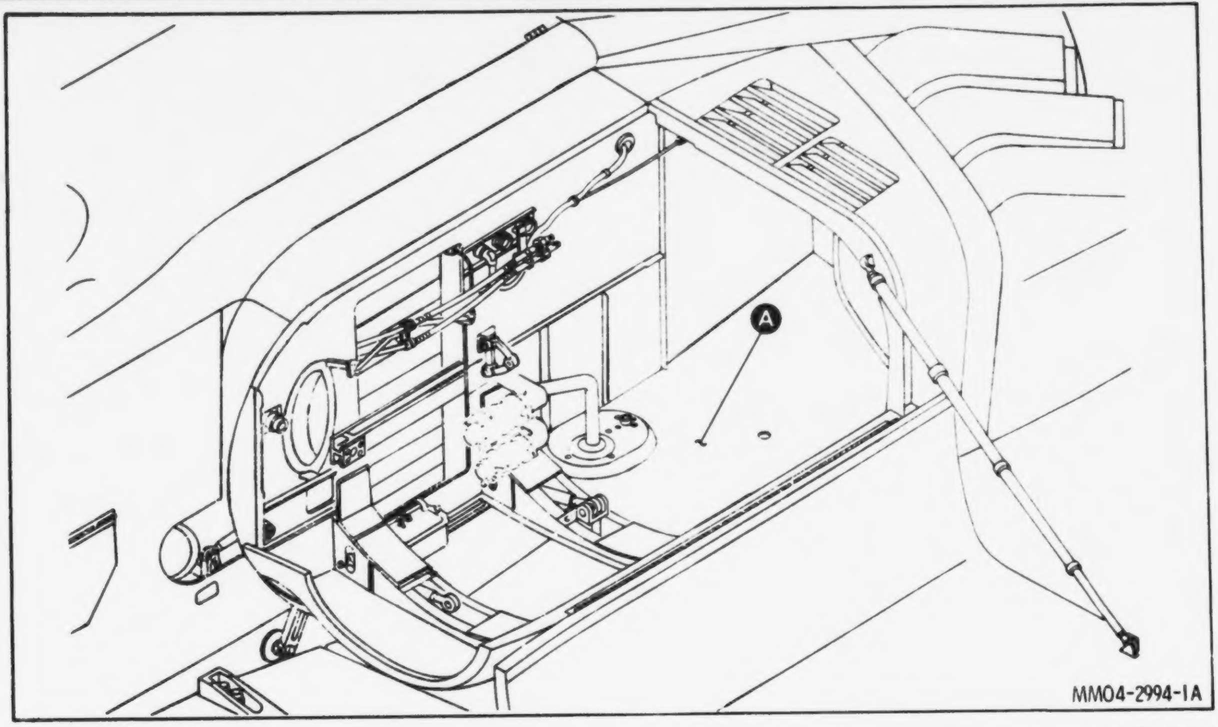
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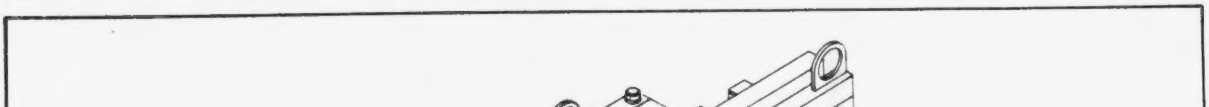
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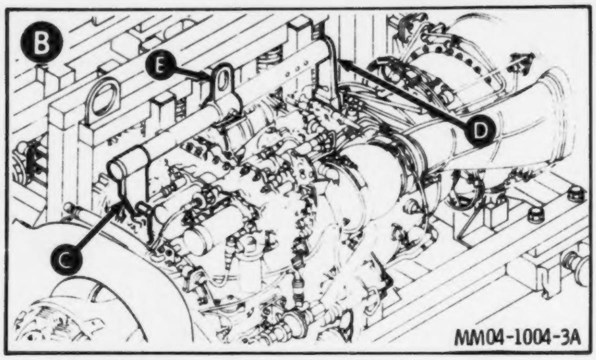
4-2-44. NO. 1 ENGINE INSTALLATION - INSTALL IN NACELLE 4-2-44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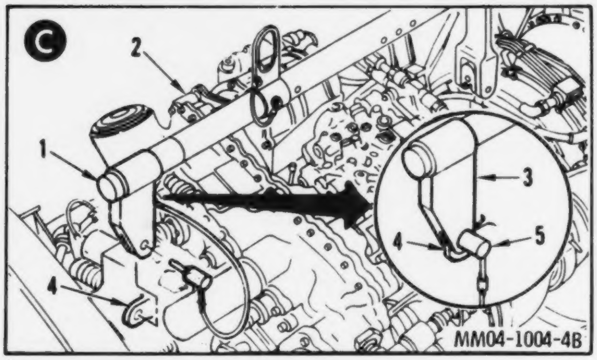
MM04-1004-3A

1. **Install sling (1) on engine (2).**
   a. Aline forward hanger link (3) with forward lifting lug (4).
   b. Install support pin (5) through link (3) and lug (4).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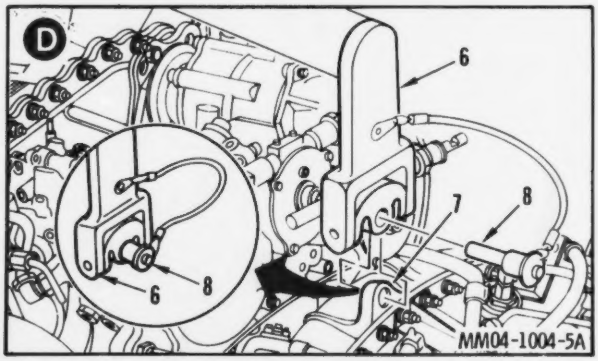
   c. Aline aft hanger link (6) with aft lifting lug (7).
   d. Install support pin (8) through link (6) and lug (7).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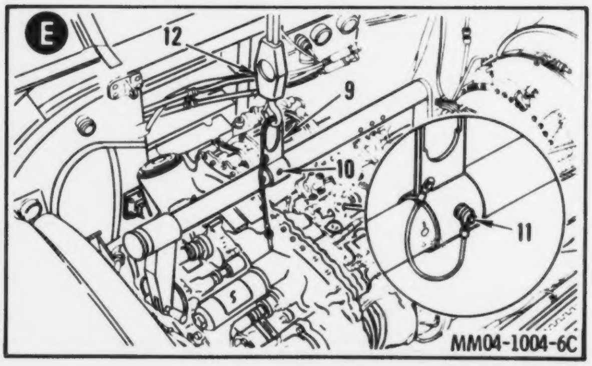
MM04-1004-5A

   e. Position lifting eye cutout (9) at position No. 2 hole (10).
   f. Insert pin (11) through lifting eye (9) and hole (10).
2. **Insert crane hook (12) into lifting eye (9).**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MM04-1004-6C

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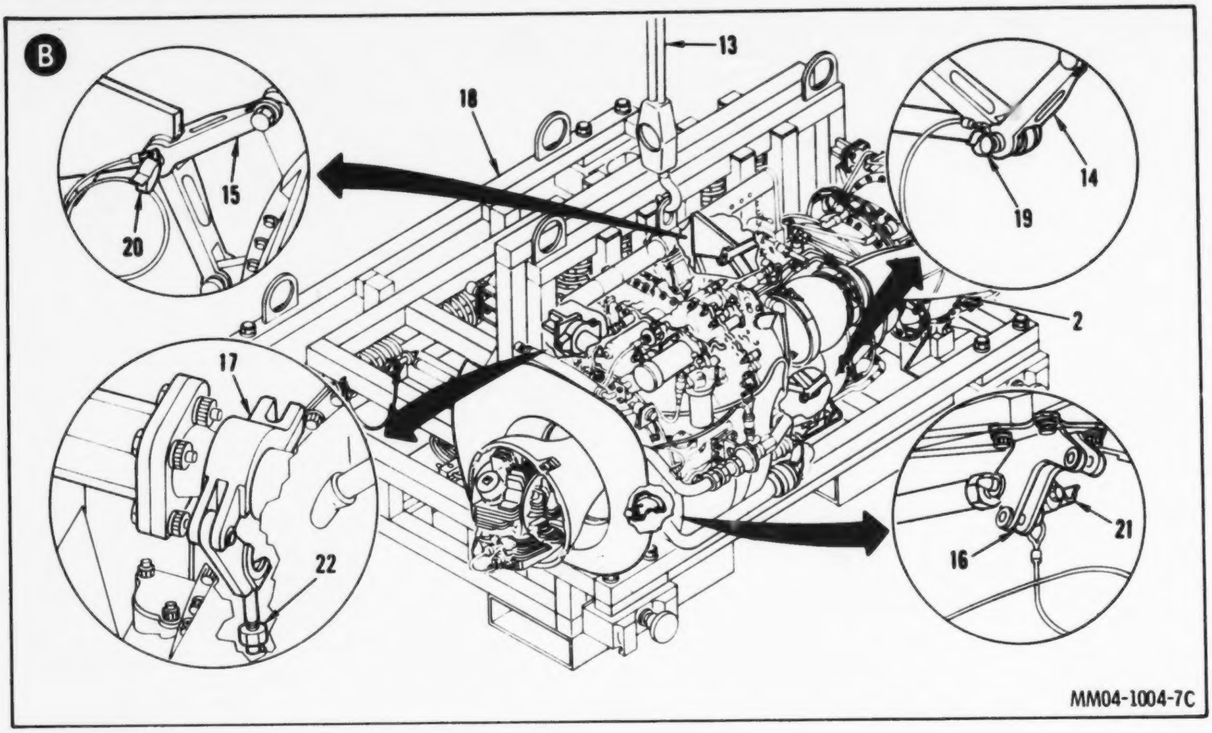
4-2-44. NO. 1 ENGINE INSTALLATION - INSTALL IN NACELLE 4-2-44



3. **Apply tension to lifting cable (13) to remove engine weight from mounts (14), (15), (16), and (17).** Use aircraft mounted crane.

4. **Remove engine (2) from engine handling adapter (18).**

   a. Unlock support pin (19) in aft lower engine mount (14).

   b. Remove pin (19).

   c. Unlock support pin (20) in aft inboard engine mount (15).

   d. Remove pin (20).

   e. Unlock support pin (21) in forward lower engine mount (16).

   f. Remove pin (21).

   g. Loosen nut (22) on forward inboard engine mount (17).

   h. Open mount (17).

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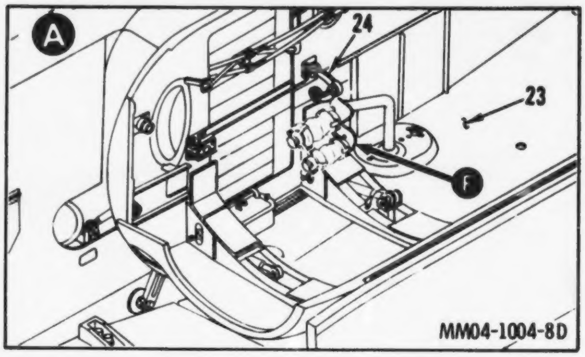
4-2-44. NO. 1 ENGINE INSTALLATION - INSTALL IN NACELLE 4-2-44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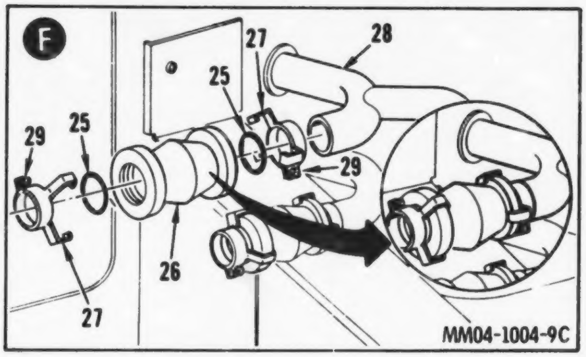
MM04-1004-8D

5. **Inspect nacelle (23) and aft engine support (24) for damage.** None allowed.

6. **Inspect nacelle for corrosion** (para 1-5-38).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7. **Install two new packings (25) in air connect housing (26).**

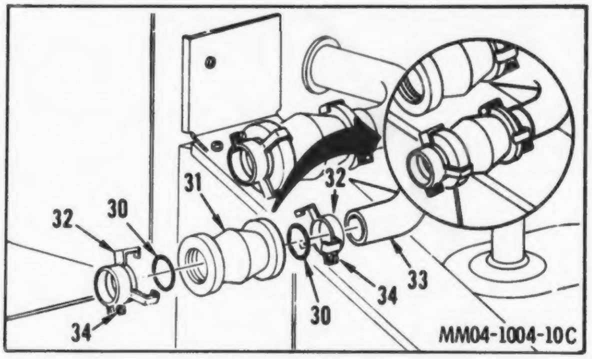
   a. Slide housing (26) and two clamps (27) off air tube (28).

   b. Remove and discard old packings (25).

   c. Install two new packings (25) at each end of housing (26).

   d. Slide housing (26) and two clamps (27) on air tube (28).

   e. Tighten two screws (29).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MM04-1004-10C

8. **Install two new packings (30) in air connect housing (31).**

   a. Slide housing (31) and two clamps (32) from air tube (33).

   b. Remove and discard old packings (30).

   c. Install two new packings (31) at each end of housing (31).

   d. Slide housing (31) and two clamps (32) on air tube (33).

   e. Tighten two screws (34).

GO TO NEXT PAGE

4-2-44. NO. 1 ENGINE INSTALLATION - INSTALL IN NACELLE 4-2-44

CAUTION

Do not use engine accessories as hand holds during engine positioning.

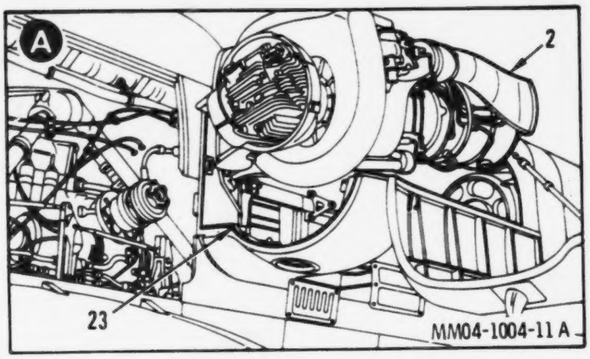
9. **Lift engine (2).** Position engine (2) above nacelle (23). Use aircraft mounted crane.

CAUTION

When lowering engine into nacelle, make sure that all hoses, electrical plugs, lines, and cables are free and clear of any obstructions.

10. **Lower engine (2) into nacelle (23).**

11. **Inspect (TI).**



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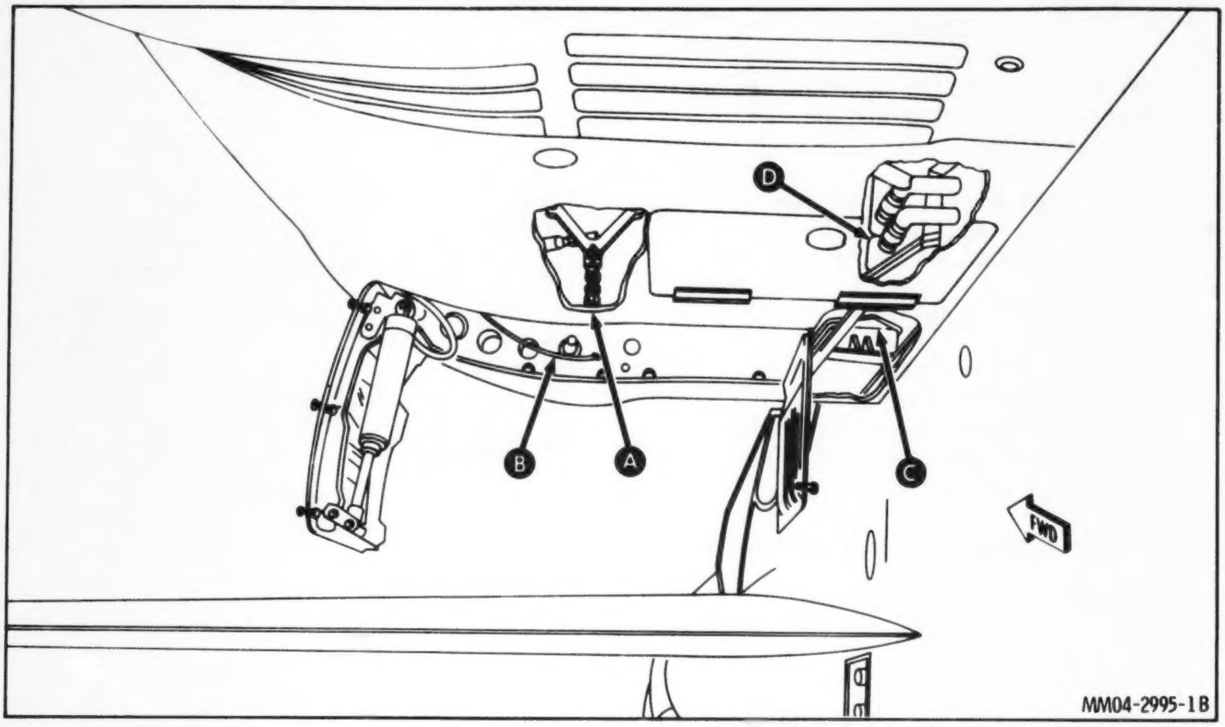
4-2-45. NO. 1 ENGINE INSTALLATION - LOWER CONNECTIONS 4-2-45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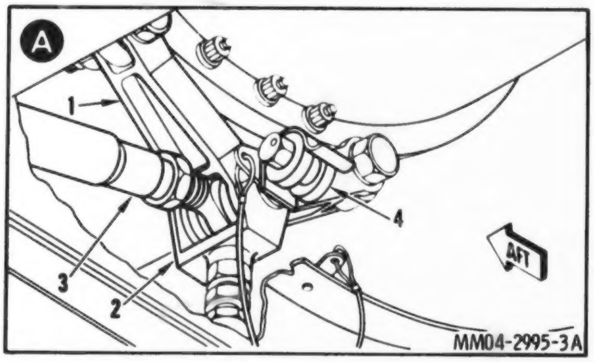
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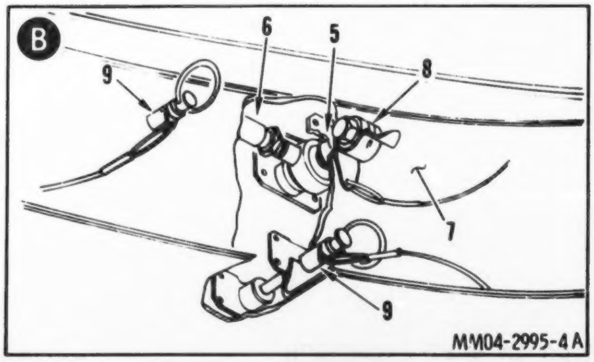
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1. **Aline aft lower engine mount (1) with lower link (2) and rod (3).**

NOTE

If forward or aft pins do not torque to **55 INCH-POUNDS**, replace support pins.

2. **Install support pin (4) through mount (1), link (2), and rod (3).** Lock and torque support pin (4) to **55 INCH-POUNDS.**
3. **Aline forward lower engine mount (5) with lower rod (6) and nacelle support (7).**
4. **Install support pin (8) through mount (5), rod (6), and support (7).** Lock and torque support pin (8) to **55 INCH-POUNDS.**
5. **Install two quick-release pins (9) through mount (5) and support (7).**

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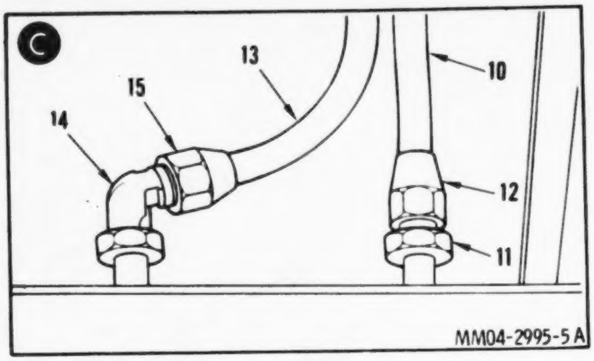
4-2-45. NO. 1 ENGINE INSTALLATION - LOWER CONNECTIONS (cont) 4-2-45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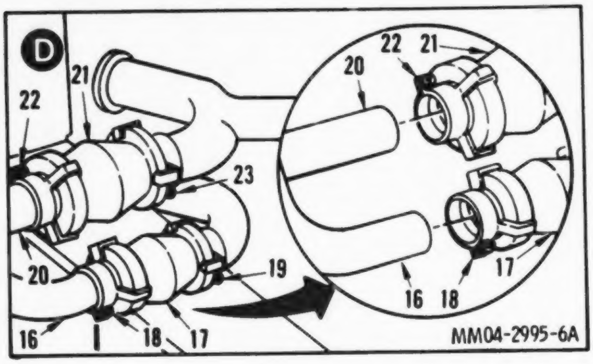
6. **Connect drain tube (10) to fitting (11).** Install hose nut (12).

7. **Connect drain hose (13) to elbow (14).** Install hose nut (15).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MM04-2995-6A

8. **Connect starter air tube (16).**
   a. Loosen screws (18) and (19).
   b. Slide connector (17) on air tube (16) until centered.
   c. Tighten clamp screws (18) and (19).

9. **Connect bleed air tube (20).**
   a. Loosen screws (22) and (23).
   b. Slide connector (21) on air tube (20) until centered.
   c. Tighten clamp screws (22) and (23).

10. **Inspect (TI).**

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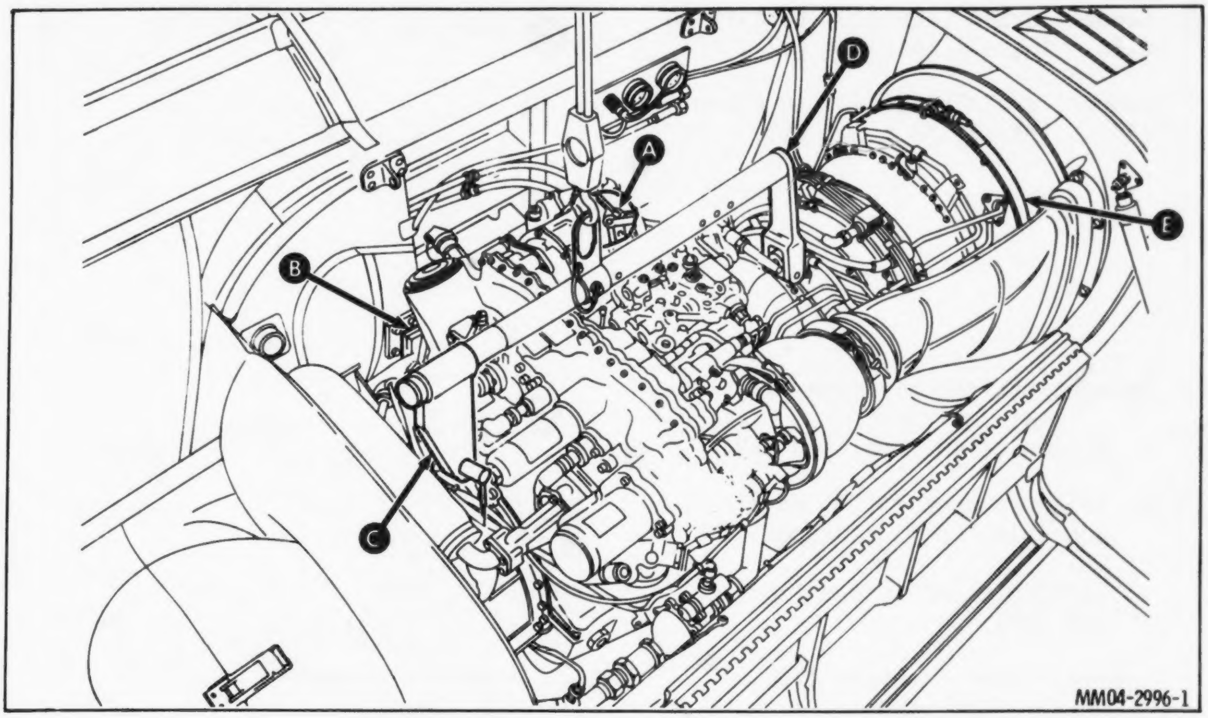
4-2-46. NO. 1 ENGINE INSTALLATION - UPPER CONNECTIONS 4-2-46



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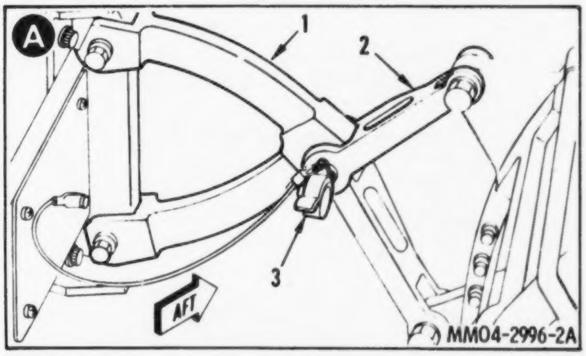
MM04-2996-1

1. **Aline aft inboard engine mount (1) with nacelle support (2).**

2. **Apply sealing compound (E120) to bushings in support (2) if they are loose.**

3. **Install support pin (3) through mount (1) and support (2).** Lock support pin.



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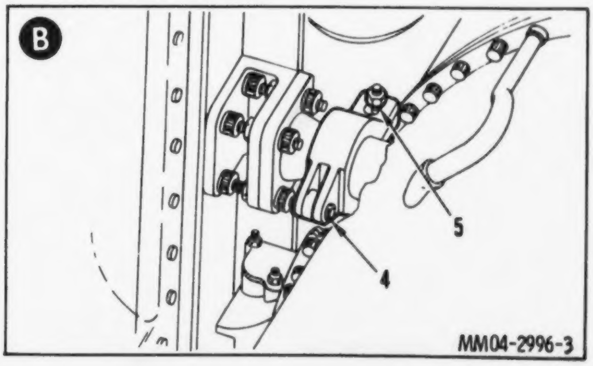

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MM04-2996-3

4. **Close forward inboard engine mount (4).** Tighten nut (5).

5. **Release tension on lifting cable.**

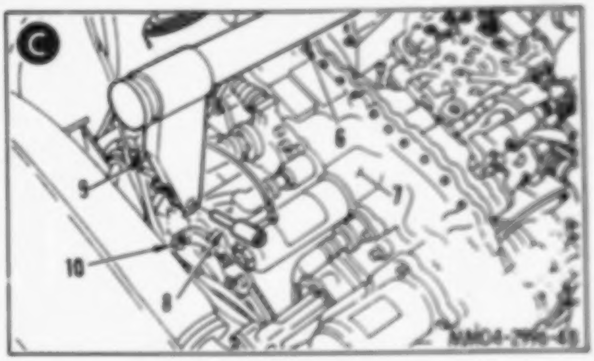
6. **Torque nut (5) to 85 INCH-POUNDS.**

GO TO NEXT PAGE

4-2-46. NO. 1 ENGINE INSTALLATION - UPPER CONNECTIONS (cont) 4-2-46

7. **Remove sling (6) from engine (7).**

   a. Remove pin (8) from forward hanger link (9) and lifting lug (10).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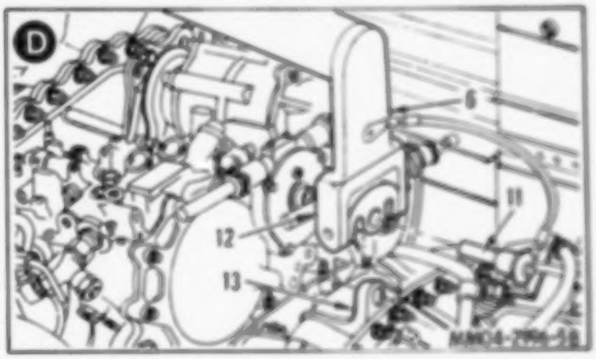
   b. Remove pin (11) from aft hanger link (12) and lifting lug (13).

   c. Remove sling (6). Use aircraft mounted crane.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MAM04-2996-5B

8. **Install primary nozzle coupling (14).**

   a. Slide nozzle (15) forward until alinement pin (16) engages hole in flange (17).

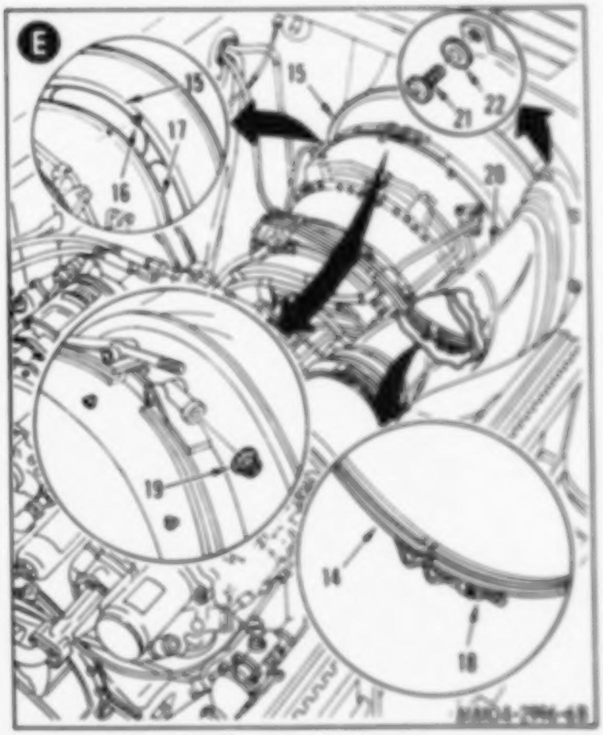
   b. Position coupling (14) where flange (17) connects to nozzle (15).

   c. Position coupling (14) with coupling nut (18) at bottom of nozzle (14).

   d. Install upper coupling nut (19).

9. **Install air duct (20) on nozzle (15).** Install three washers (22) and screws (20).

10. **Torque nuts (18) and (19) alternately to 55 INCH-POUNDS.**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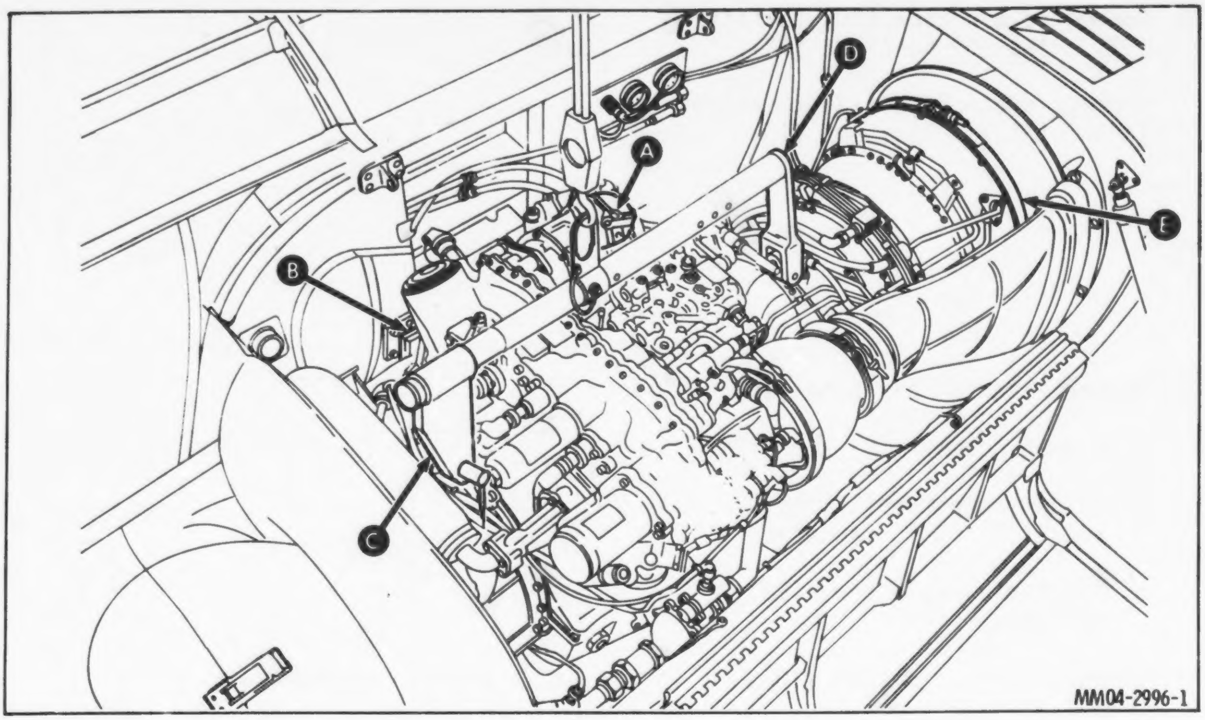
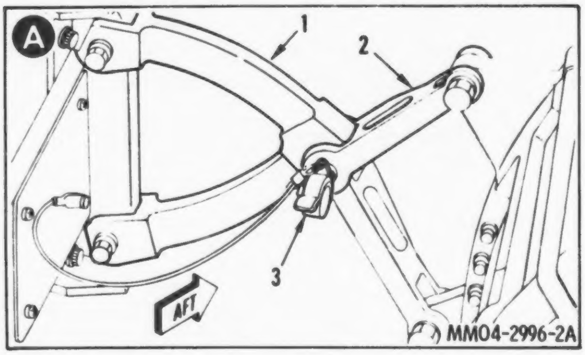
4-2-46. NO. 1 ENGINE INSTALLATION - UPPER CONNECTIONS 4-2-46



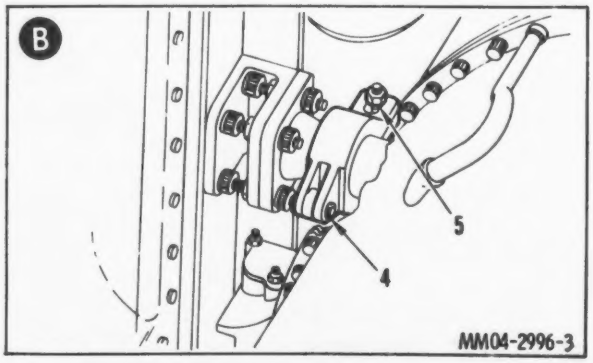
MM04-2996-1

1. Aline aft inboard engine mount (1) with nacelle support (2).
2. Apply sealing compound (E120) to bushings in support (2) if they are loose.
3. Install support pin (3) through mount (1) and support (2). Lock support pin.



MM04-2996-2A

4. Close forward inboard engine mount (4). Tighten nut (5).
5. Release tension on lifting cable.
6. Torque nut (5) to 85 INCH-POUNDS.



MM04-2996-3

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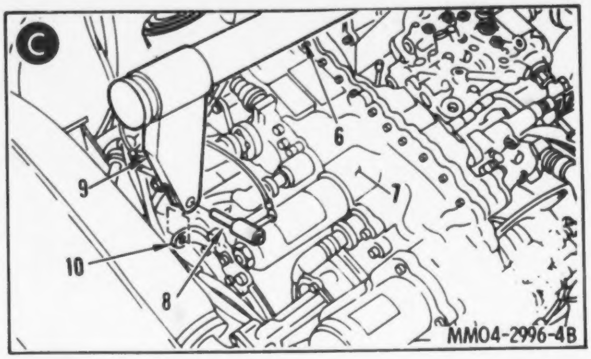
4-2-46. NO. 1 ENGINE INSTALLATION - UPPER CONNECTIONS (cont) 4-2-46

7. Remove sling (6) from engine (7).

a. Remove pin (8) from forward hanger link (9) and lifting lug (10).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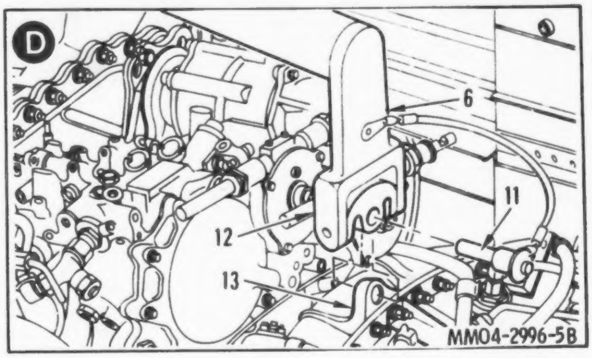
MM04-2996-4B

b. Remove pin (11) from aft hanger link (12) and lifting lug (13).

c. Remove sling (6). Use aircraft mounted crane.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8. Install primary nozzle coupling (14).

a. Slide nozzle (15) forward until alinement pin (16) engages hole in flange (17).

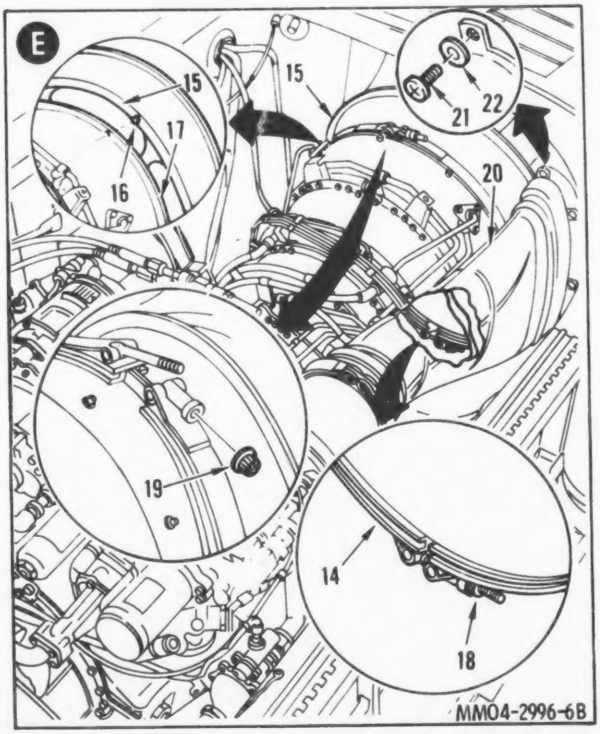
b. Position coupling (14) where flange (17) connects to nozzle (15).

c. Position coupling (14) with coupling nut (18) at bottom of nozzle (14).

d. Install upper coupling nut (19).

9. Install air duct (20) on nozzle (15). Install three washers (22) and screws (20).

10. Torque nuts (18) and (19) alternately to 55 INCH-POUNDS.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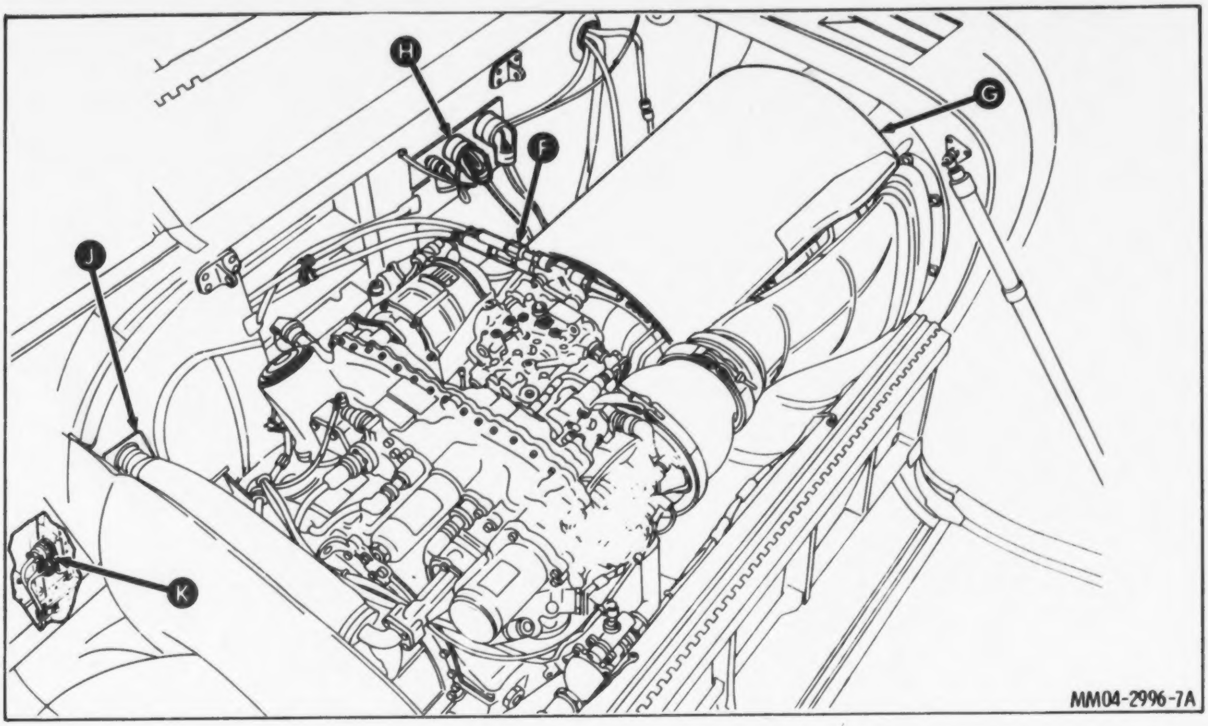
4-2-46. NO. 1 ENGINE INSTALLATION - UPPER CONNECTIONS (cont) 4-2-46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11. **Connect cable (23) to power available spindle gearbox (24).**

    a. Remove cable (23) from upper clip (25).

    b. Connect cable (23) to power available spindle fitting (26).

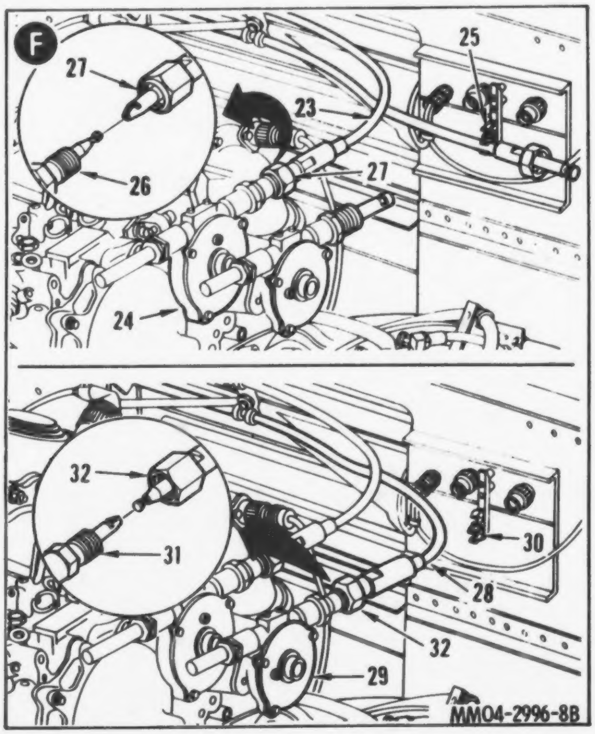
    c. Install coupling nut (27).

12. **Connect cable (28) to load demand spindle gearbox (29).**

    a. Remove cable (28) from lower clip (30).

    b. Connect cable (28) to load demand spindle fitting (31).

    c. Install coupling nut (32).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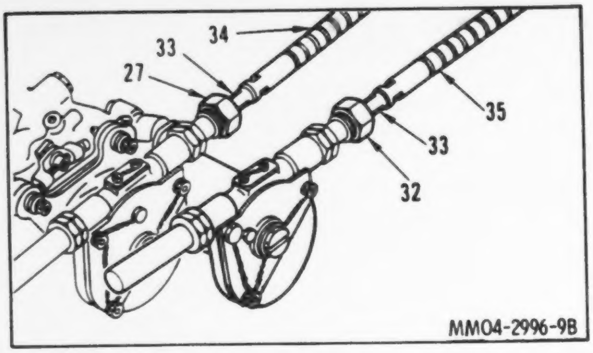
4-2-46. NO. 1 ENGINE INSTALLATION - UPPER CONNECTIONS (cont) 4-2-46

13. **Torque coupling nuts (27) and (32) to 70 INCH-POUNDS.**
    a. Hold flats (33) on cable housing (34) and (35).
    b. Torque nuts (27) and (32) to 70 INCH-POUNDS.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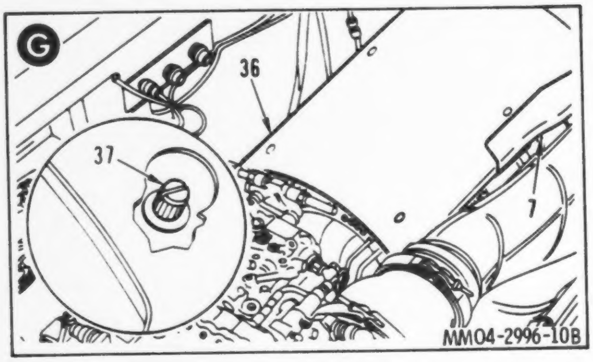
MM04-2996-9B

14. **Install engine shroud (36).**
    a. Position shroud (36) on top of engine (7).
    b. Install four turnlock fasteners (37).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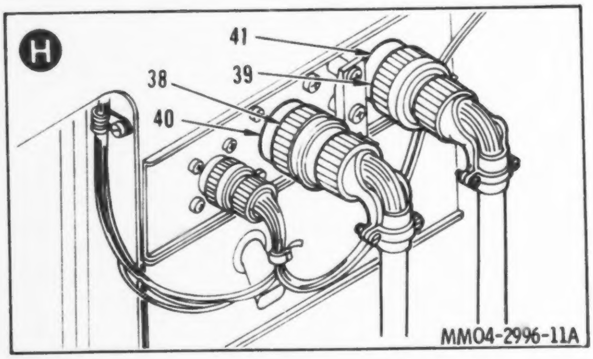
15. **Attach connector P23 (38) to connector J23 (40).**
16. **Attach connector P21 (39) to connector J21 (41).**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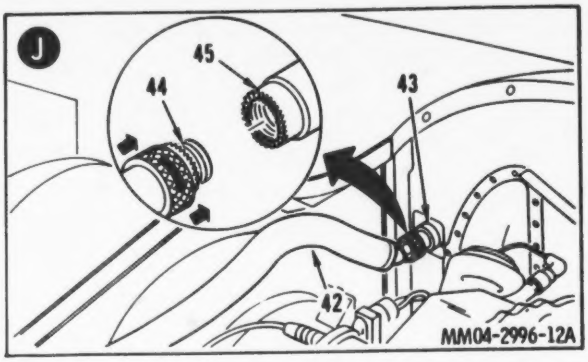
4-2-46. NO. 1 ENGINE INSTALLATION - UPPER CONNECTIONS (cont) 4-2-46

17. **Connect fuel hose (42) to breakaway valve (43).**

    a. Aline ratchet sleeve (44) with adapter (45).

    b. Turn sleeve (44) clockwise until locking teeth are fully engaged and seated.



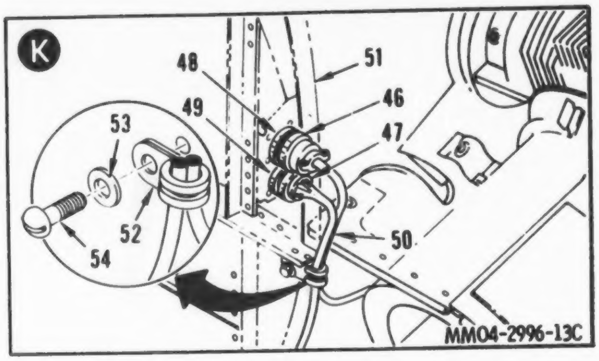
18. **Attach connectors P61 (46) to connector J61 (48)**

19. **Attach connector P47 (47) to connector J47 (49).**

20. **Attach wire harness (50) to airframe (51).**

    a. Install clamp (52) on wire harness (50).

    b. Install screw (53) through washer (54) and clamp (52).



21. **Inspect (TI).**

22. **Install No. 1 drive shaft** (para 6-2-2).

23. **Service No. 1 engine oil system** (para 1-5-13). **Observe all safety precautions.**

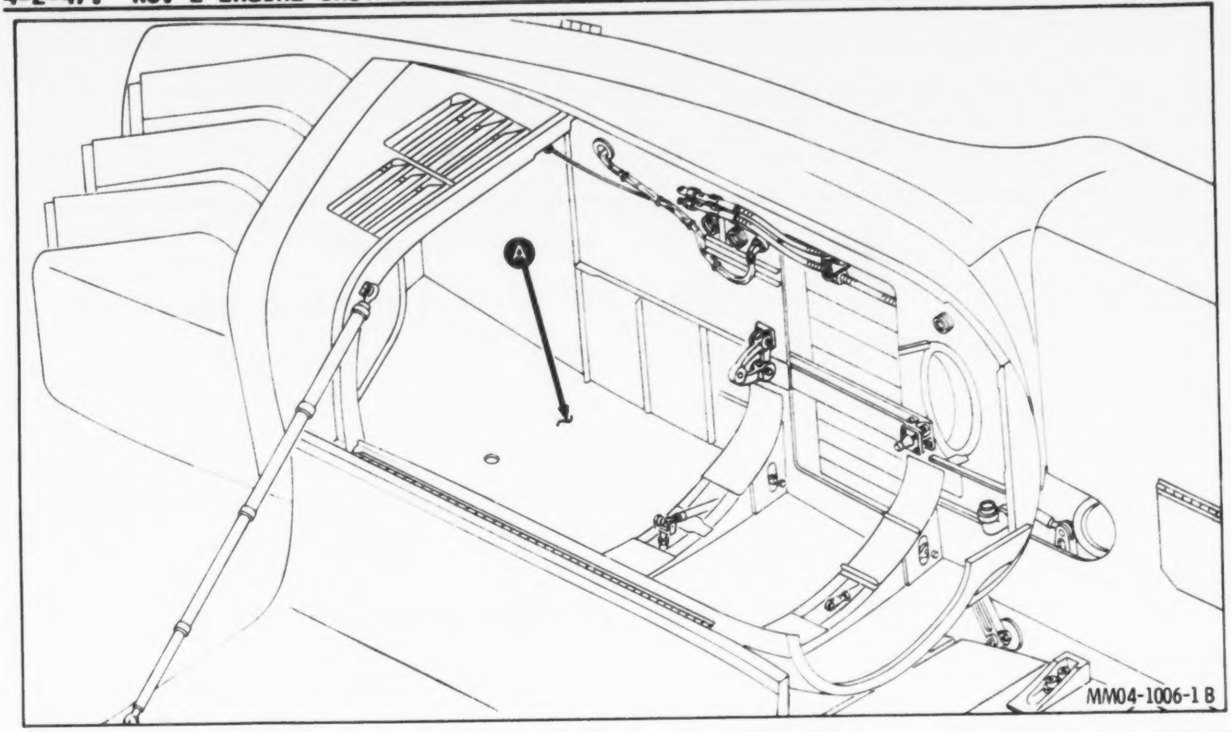
24. **Prime fuel system** (para 1-5-12). **Observe all safety precautions.**

25. **Close engine work platform doors LN1, LN3, and LN4** (para 2-2-2).

26. **Remove maintenance crane** (para 1-7-50).

27. **Perform power plants - operational check (engine 1)** (TM 55-1520-238-T).

END OF TASK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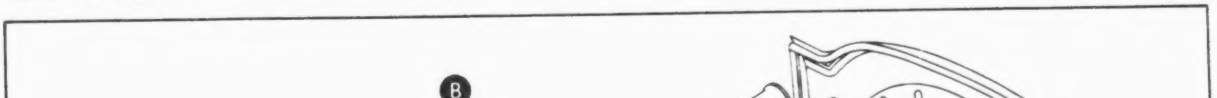
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4-2-47. NO. 2 ENGINE INSTALLATION (cont) 4-2-47

This task covers:

4-2-48. No. 2 Engine Installation - Install in Nacelle
4-2-49. No. 2 Engine Installation - Lower Connections
4-2-50. No. 2 Engine Installation - Upper Connections

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Crowfoot Attachment, 9/16, 1/4 Drive	5120-00-541-4074
Kit, Aircraft Adapter	1730-01-240-6743
Sling, Engine	4290-01-108-3484

Materials/Parts:

Packing (4)
(E120) Compound, Sealing

Personnel Required:

67R10 Attack Helicopter Repairer (3) Two to assist
66R30 Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
6-4-15	Nose gearbox and quill shaft installed

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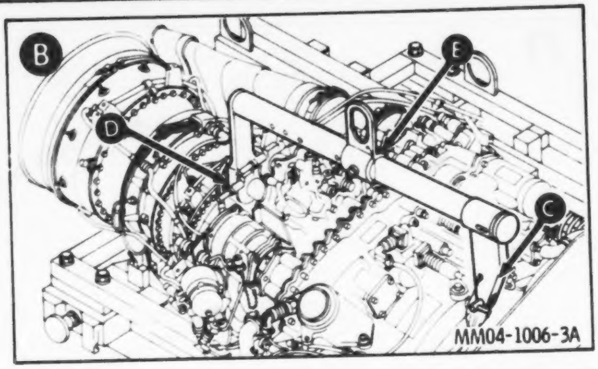
4-2-48. NO. 2 ENGINE INSTALLATION - INSTALL IN NACELLE 4-2-48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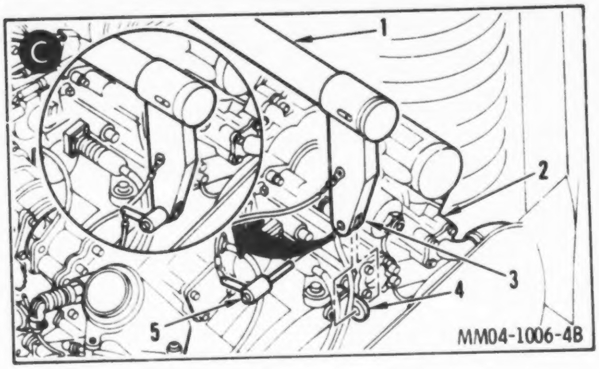
MM04-1006-3A

1. **Install sling (1) on engine (2).**

   a. Aline forward hanger link (3) with forward lifting lug (4).

   b. Install support pin (5) through link (3) and lug (4).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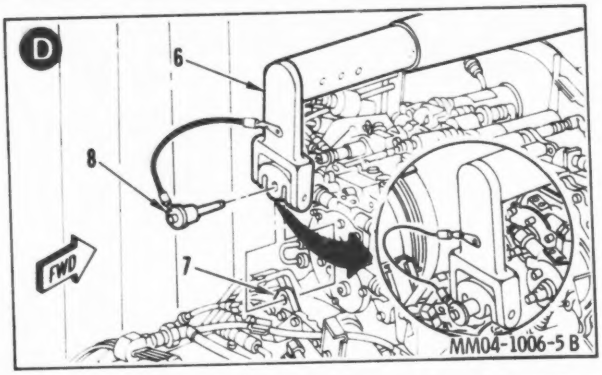
   c. Aline aft hanger link (6) with aft linking lug (7).

   d. Install support pin (8) through link (6) and lug (7).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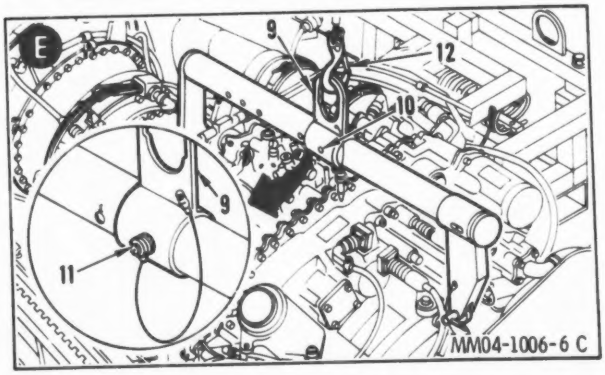
   e. Position lifting eye (9) at hole position No. 2 (10).

   f. Insert pin (11) through lifting eye (9) and hole No. 2 (10).

2. **Insert crane hook (12) into eye (9).**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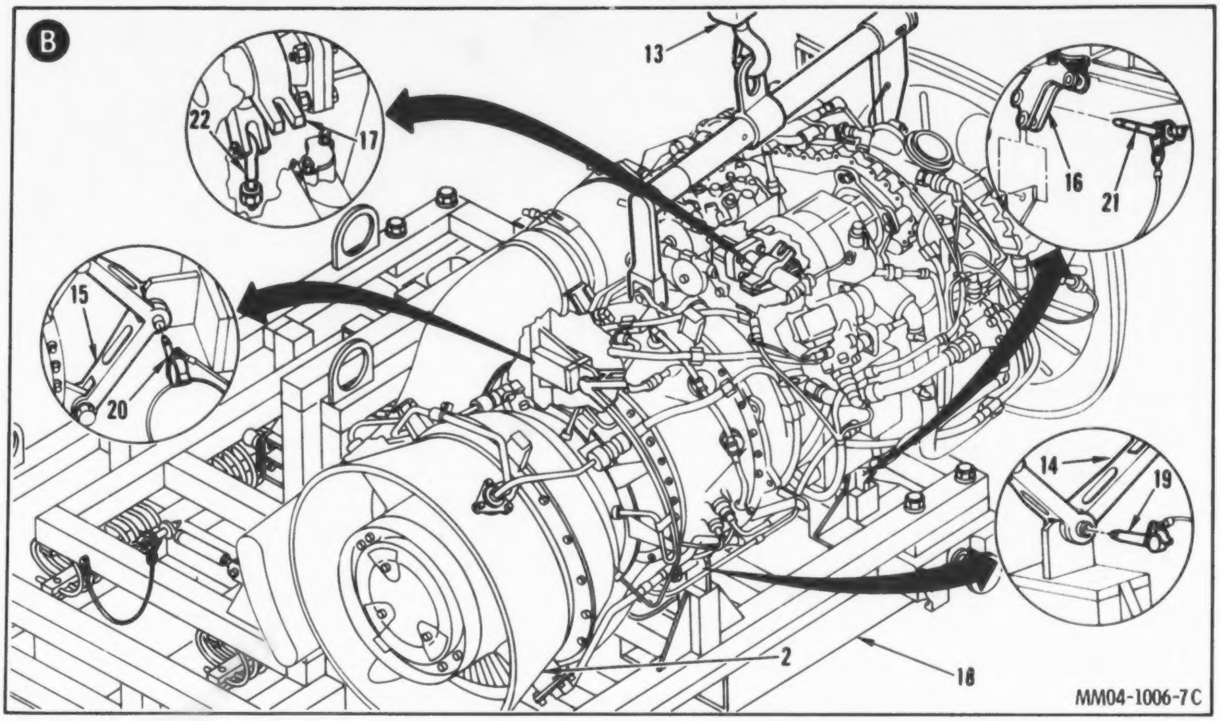
4-2-48. NO. 2 ENGINE INSTALLATION - INSTALL IN NACELLE (cont) 4-2-48



3. **Apply tension to lifting cable (13) to remove engine weight from mounts (14,), (15), (16), and (17). Use aircraft mounted crane.**

4. **Remove engine (2) from engine handling adapter (18).**

   a. Unlock support pin (19) in aft lower engine mount (14).

   b. Remove pin (19).

   c. Unlock support pin (20) in aft inboard engine mount (15).

   d. Remove pin (20).

   e. Unlock support pin (21) in forward lower engine mount (16).

   f. Remove pin (21).

   g. Loosen nut (22) on forward inboard engine mount (17).

   h. Open mount (17).

GO TO NEXT PAGE

4-2-48. NO. 2 ENGINE INSTALLATION - INSTALL IN NACELLE (cont) 4-2-48

5. **Install two new packings (23) in air connect housing (24).**

   a. Loosen two screws (25).

   b. Slide housing (24) and two clamps (26) from air tube (27).

   c. Remove two clamps (26) from housing (24).

   d. Remove and discard old packings (23).

   e. Install one new packing (23) at each end of housing (24).

   f. Install two clamps (26) on housing (24).

   g. Slide housing (24) and two clamps (26) on air tube (27).

   h. Tighten two screws (25).

6. **Install two new packings (28) in air connect housing (29).**

   a. Loosen two screws (30).

   b. Slide housing (29) and two clamps (31) from air tube (32).

   c. Remove two clamps (31) from housing (29).

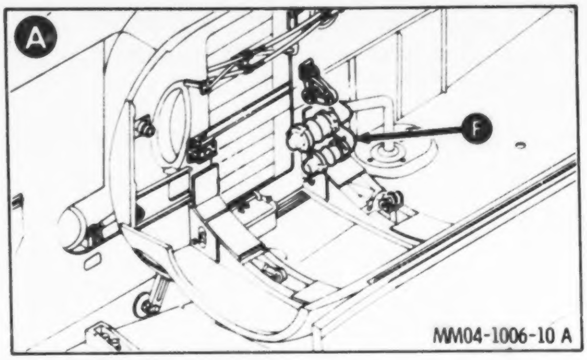
   d. Remove and discard old packings (28).

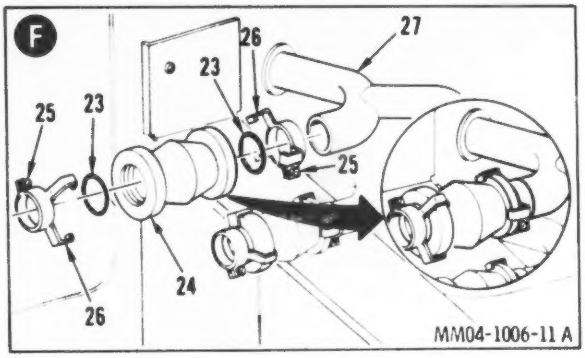
   e. Install one new packing (28) at each end of housing (29).

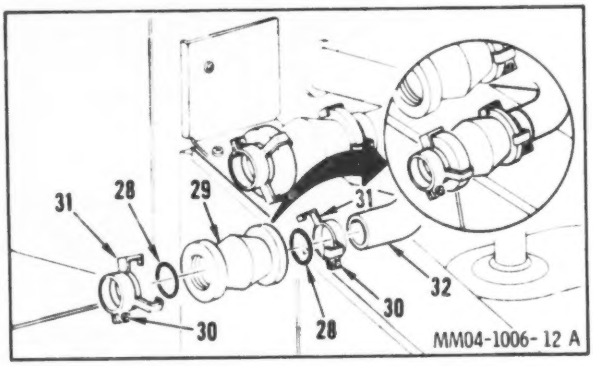
   f. Install two clamps (31) on housing (29).

   g. Slide housing (29) and two clamps (31) on air tube (32).

   h. Tighten two screws (30).







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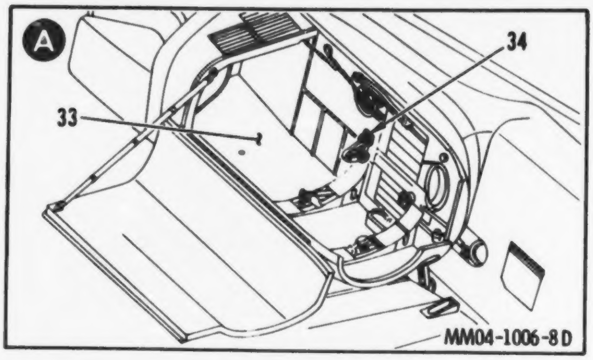
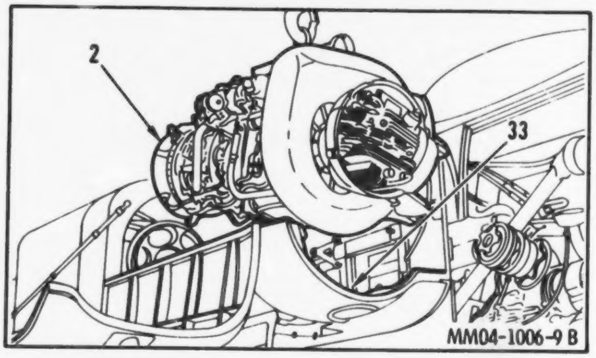
4-2-48. NO. 2 ENGINE INSTALLATION - INSTALL IN NACELLE (cont) 4-2-48

7. **Inspect nacelle (33) and aft engine support (34) for damage.** None allowed.

8. **Inspect nacelle (33) for corrosion** (para 1-5-38).





CAUTION

Do not use engine accessories as hand holds during engine positioning.

9. **Lift engine (2). Position engine (2) above nacelle (33).** Use aircraft mounted crane.

CAUTION

When lowering engine into nacelle, make sure that all hoses, electrical plugs, lines, and cables are clear of obstructions.

10. **Lower engine (2) into nacelle (33).** Use aircraft mounted crane.

11. **Inspect (TI).**

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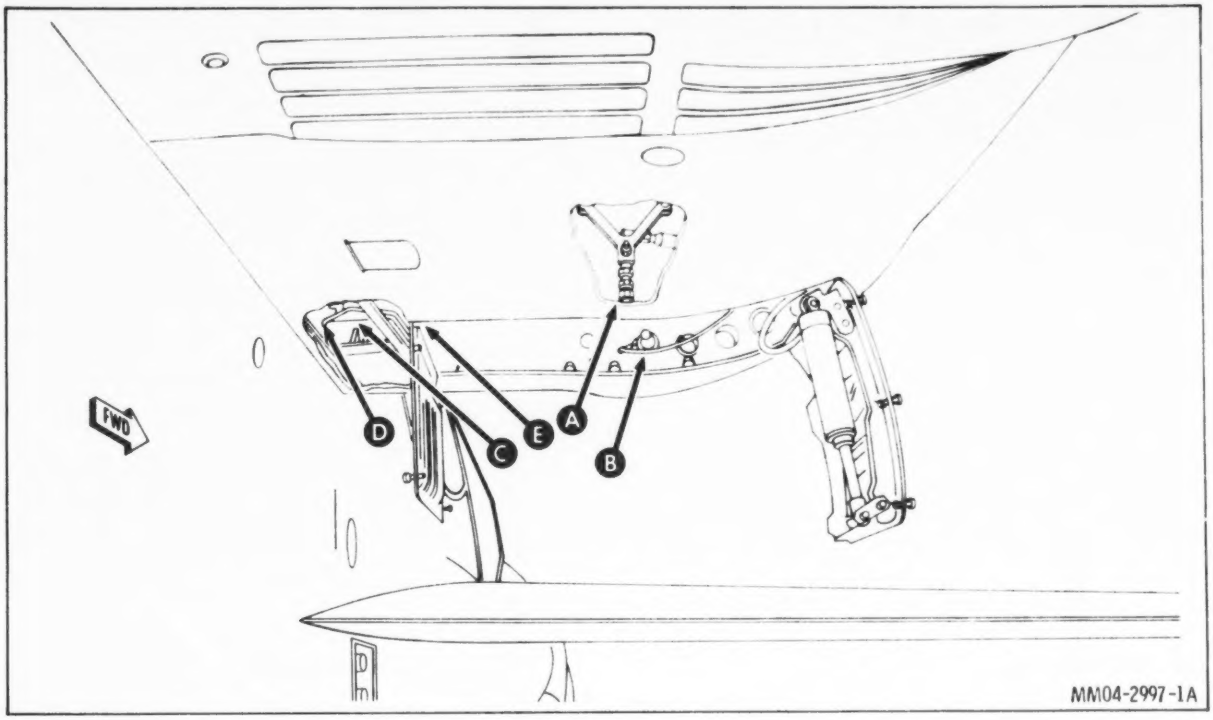
4-2-49. NO. 2 ENGINE INSTALLATION - LOWER CONNECTIONS 4-2-49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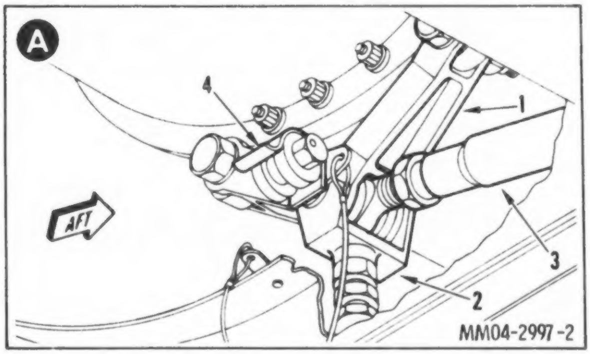
1. Aline aft lower engine mount (1) with lower link (2) and rod (3).

NOTE

If forward or aft support pins do not torque to 55 INCH-POUNDS, replace support pins.

2. Install support pin (4) through mount (1), link (2), and rod (3). Lock and torque support pin (4) to 55 INCH-POUNDS.
3. Aline forward lower engine mount (5) with lower rod (6) and nacelle support (7).
4. Install support pin (8) through mount (5), rod (6), and support (7). Lock and torque support pin (8) to 55 INCH-POUNDS.
5. Install two quick-release pins (9) through mount (5) and support (7).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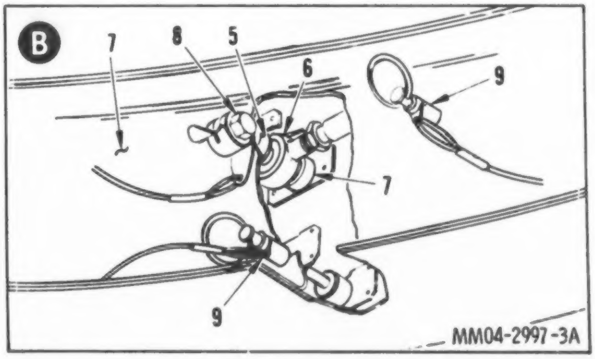
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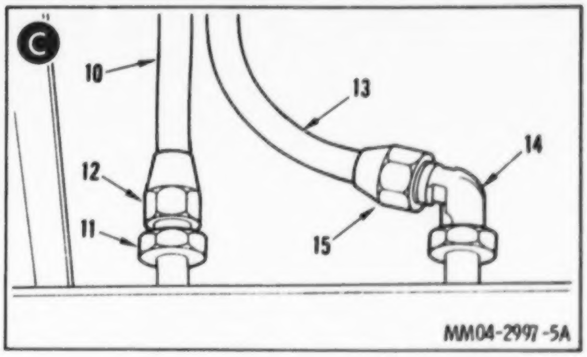
4-2-49. NO. 2 ENGINE INSTALLATION - LOWER CONNECTIONS (cont) 4-2-49

6. **Connect drain tube (10) to fitting (11).** Install hose nut (12).

7. **Connect drain hose (13) to elbow (14).** Install hose nut (15).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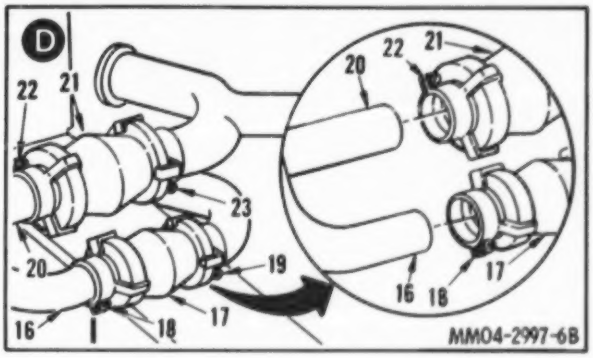
8. **Connect starter air tube (16).**

    a. Loosen screws (18) and (19).

    b. Slide connector (17) on air tube (16) until centered.

    c. Tighten clamp screws (18) and (19).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9. **Connect bleed air tube (20).**

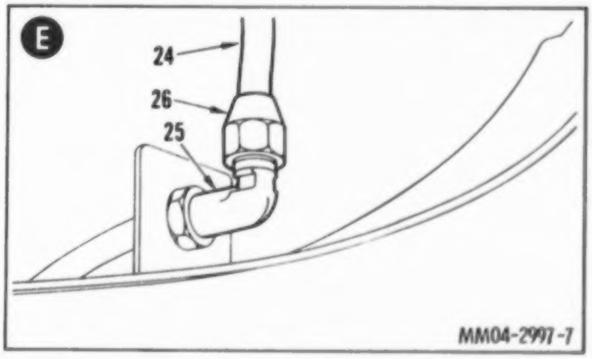
    a. Loosen screws (22) and (23).

    b. Slide connector (21) on air tube (20) until centered.

    c. Tighten clamp screws (22) and (23).

10. **Connect bleed tube (24) to fitting (25).** Install hose nut (26).

11. **Inspect (TI).**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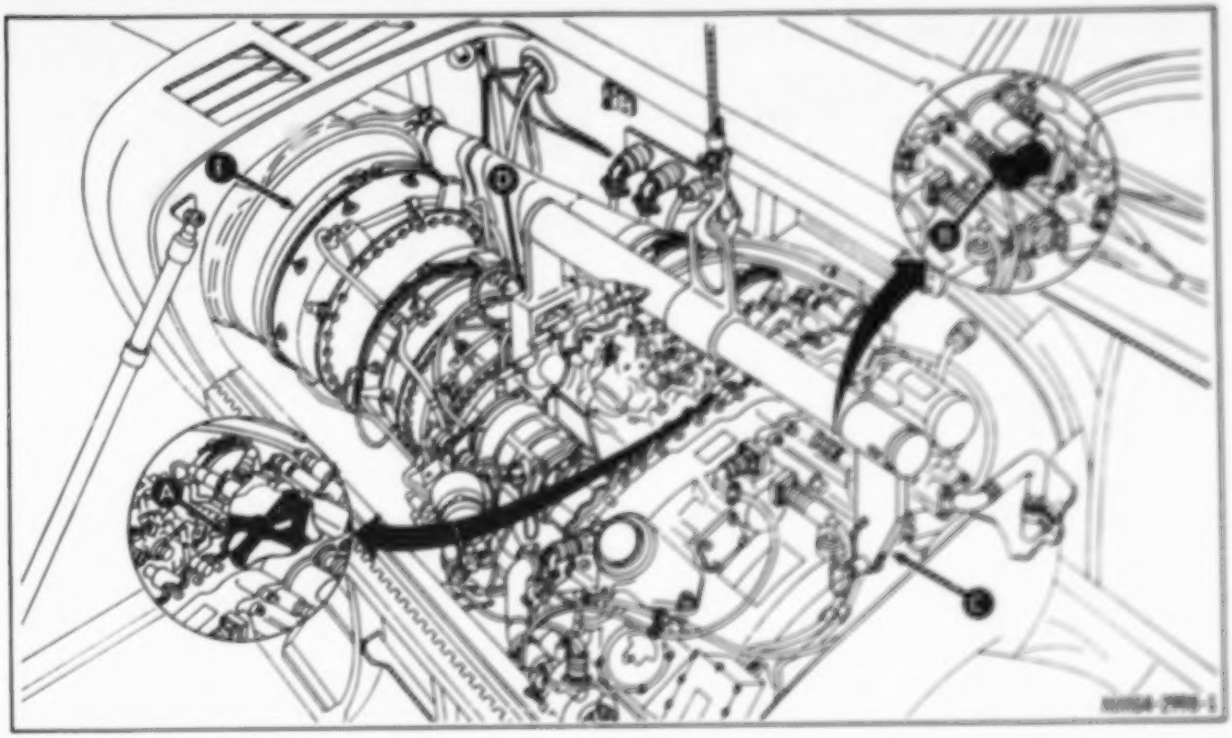
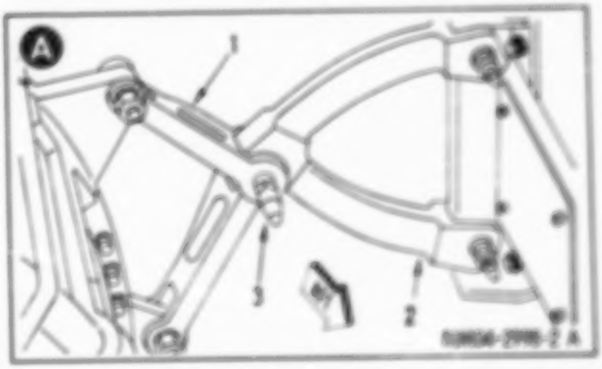
4-2-50. NO. 2 ENGINE INSTALLATION - UPPER CONNECTIONS 4-2-50



1. Aline aft inboard engine mount (1) with nacelle support (2).

2. Apply sealing compound (E120) to bushings in support (2) if they are loose.

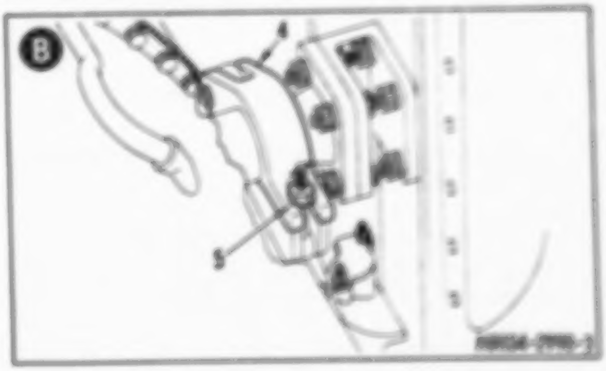
3. Install support pin (3) through mount (1) and support (2). Lock support pin (3).



4. Close and latch forward inboard engine mount (4). Tighten clamp nut (5).

5. Release tension on cable.

6. Torque nut (5) to 85 INCH-POUNDS.



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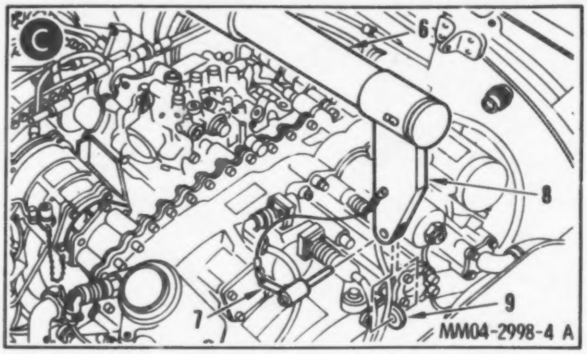
4-2-50. NO. 2 ENGINE INSTALLATION - UPPER CONNECTIONS (cont) 4-2-50

7. **Remove engine sling (6).**

   a. Remove pin (7) from forward hanger link (8) and lifting lug (9).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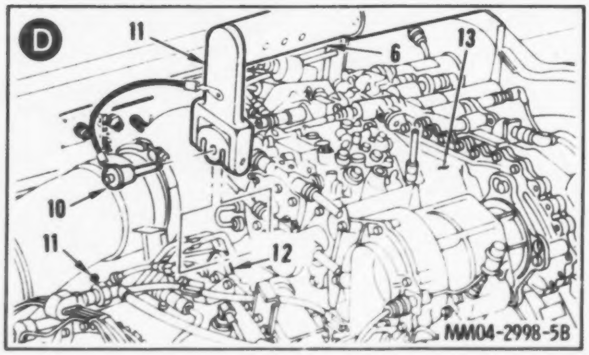
   b. Remove pin (10) from aft hanger link (11) and lifting lug (12).

   c. Remove sling (6) from engine (13).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8. **Install primary nozzle coupling (14).**

   a. Slide nozzle (15) forward until alinement pin (16) engages hole in engine flange (17).

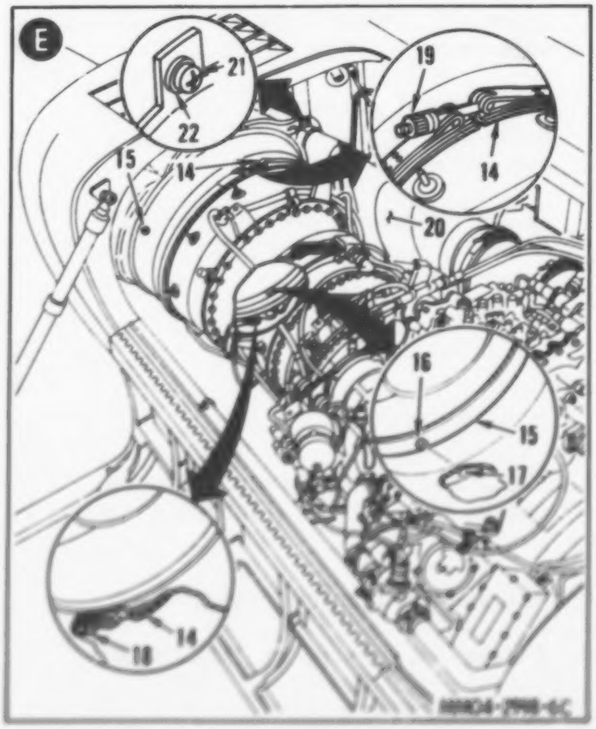
   b. Position coupling (14) where engine flange (17) meets nozzle (15).

   c. Position coupling (14) with coupling nut (18) at bottom of nozzle (15).

   d. Install upper coupling nut (19).

9. **Torque nuts (18) and (19) alternately to 55 INCH-POUNDS.**

10. **Connect air duct (20) to primary nozzle (15). Install three washers (22) and bolts (21).**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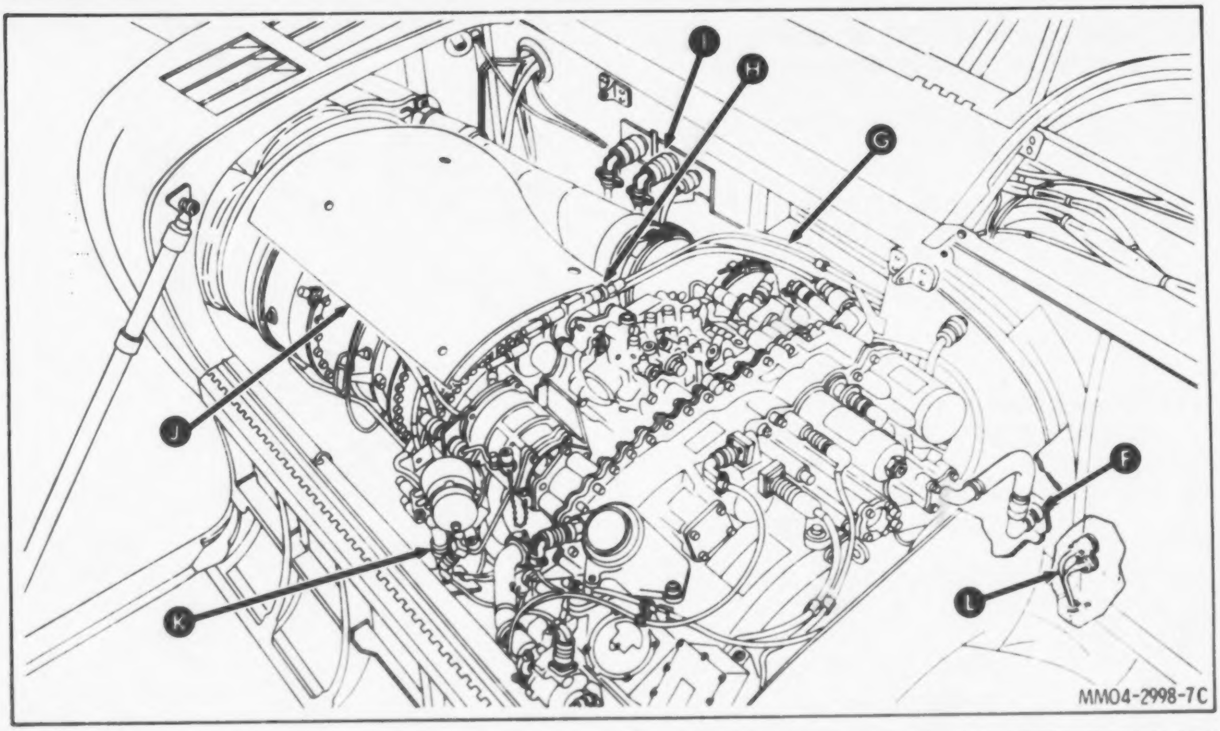
4-2-50. NO. 2 ENGINE INSTALLATION - UPPER CONNECTIONS (cont) 4-2-50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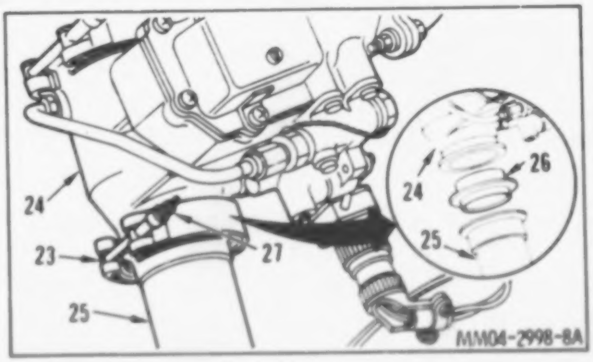
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11. Install coupling (23) to connect regulator valve (24) to starter air tube (25).

    a. Install spacer (26) in starter air tube (25).

    b. Install coupling (23).

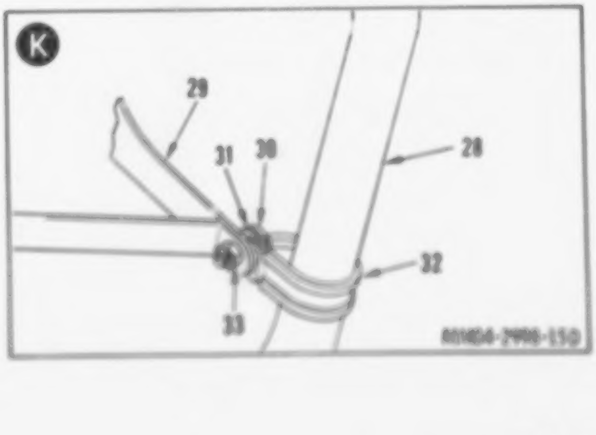
    c. Install coupling nut (27).

12. Torque nut (27) to 30 INCH-POUNDS.

13. Install starter air tube (28) on support (29).

    a. Insert screw (30) through washer (31), clamp (32), and support (29).

    b. Install nut (33) on screw (30).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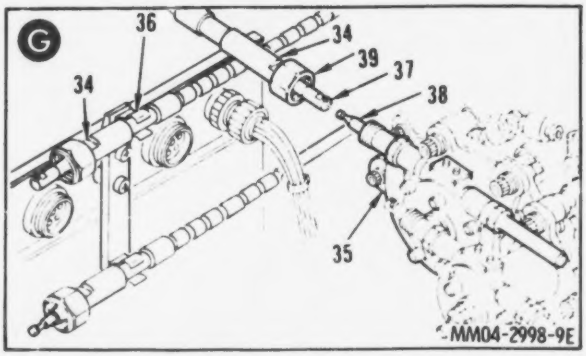
4-2-50. NO. 2 ENGINE INSTALLATION - UPPER CONNECTIONS (cont) 4-2-50

14. **Connect cable (34) to power available spindle gearbox (35).**

    a. Remove cable (34) from top clip (36).

    b. Connect cable fitting (37) to gearbox fitting (38).

    c. Install coupling nut (39).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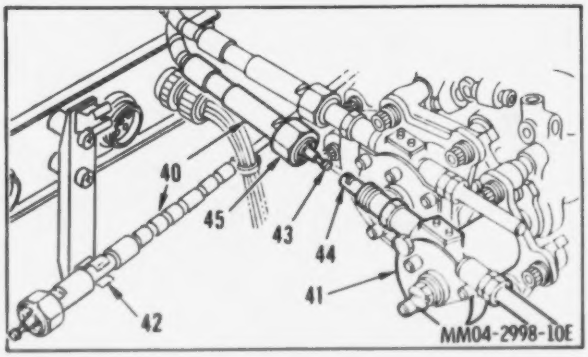
15. **Connect cable (40) to load demand spindle gearbox (41).**

    a. Remove cable (40) from lower clip (42).

    b. Connect cable fitting (43) to gearbox fitting (44).

    c. Install coupling nut (45).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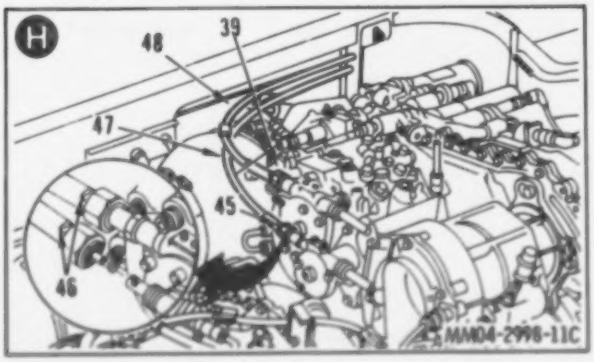
16. **Torque coupling nuts (39) and (45) to 70 INCH-POUNDS.**

    a. Hold flats (46) on cable housings (47) and (48).

    b. Torque coupling nuts (39) and (45) to 70 **INCH-POUNDS.**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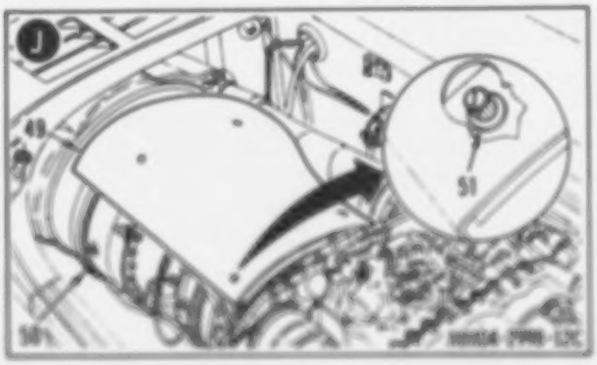
17. **Install engine shroud (49).**

    a. Position shroud (49) on top of engine (50).

    b. Install four turnlock fasteners (51).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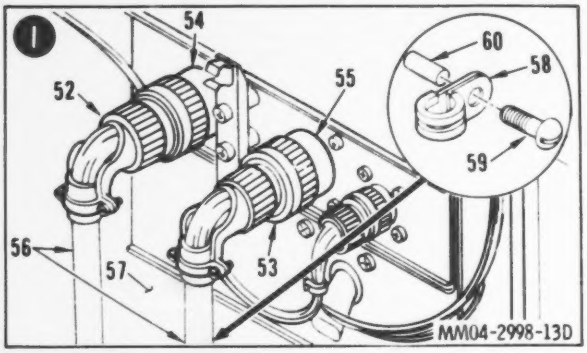
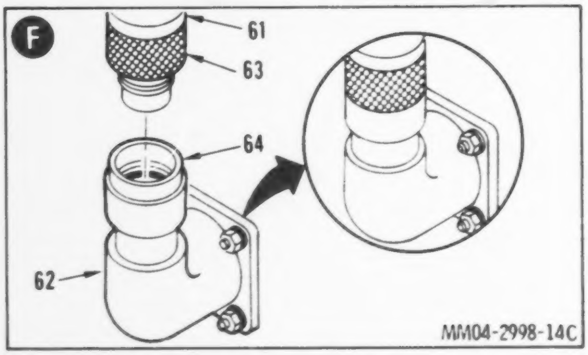
4-2-50. NO. 2 ENGINE INSTALLATION - UPPER CONNECTIONS (cont) 4-2-50

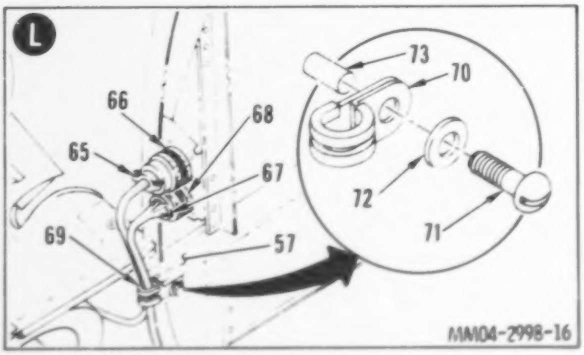
18. **Attach aft connectors P22 (52) to connector J22 (54).**
19. **Attach connector P24 (53) to connector J24 (55).**
20. **Attach wires (56) to airframe (57).**
    a. Position clamp (58) on wires (56).
    b. Install screw (59) through clamp (58) and spacer (60) into airframe (57).



21. **Connect fuel hose (61) to receptacle (62).**
    a. Aline ratchet sleeve (63) with adapter (64).
    b. Turn sleeve (63) clockwise until locking teeth are fully engaged and seated.



22. **Attach connector P60 (65) to connector J60 (66).**
23. **Attach connector P48 (67) to connector J48 (68).**
24. **Attach wire harness (69) to airframe (57).**
    a. Position clamp (70) on wire harness (69).
    b. Install screw (71) through washer (72), clamp (70), and spacer (73) into airframe (57).



25. **Inspect (TI).**
26. **Install No. 2 drive shaft** (para 6-2-2).
27. **Service No. 2 engine oil system** (para 1-5-13).
28. **Prime fuel system** (para 1-5-12)
29. **Close engine work platform doors RN1, RN3 and RN4 and install panel R200** (para 2-2-2).
30. **Remove maintenance crane** (para 1-7-50).
31. **Perform power plants operational check (engine 2)** (TM 55-1520-238-T).

END OF TASK

4-2-51. NO. 1 OR NO. 2 ENGINE TENSION CLIP REPLACEMENT 4-2-51

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Equipment Conditions:

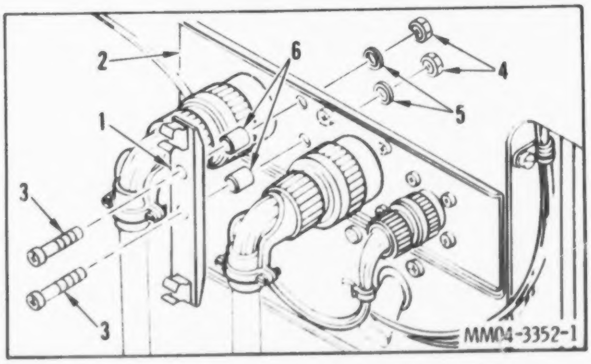
Ref	Condition
1-7-2	Helicopter safed
2-2-2	LN1 or RN2, T250L, T250R, T290L, T290R, and L325 opened

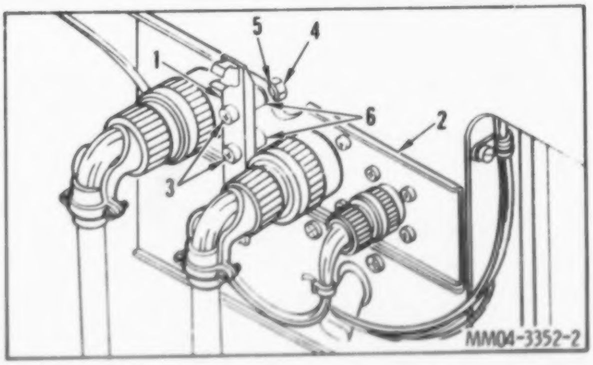
Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

NOTE

This task is typical for No. 1 or No. 2 engine tension clip.





A. **REMOVAL**

1. **Remove tension clip (1) from engine firewall (2).**
   - a. Hold two screws (3).
   - b. Remove two nuts (4) and washers (5).
   - c. Remove two spacers (6), tension clip (1), and two screws (3).

B. **INSTALLATION**

1. **Install tension clip (1) on engine firewall (2).**
   - a. Install two screws (3) through tension clip (1), two spacers (6), and engine firewall (2).
   - b. Install two washers (5) and nuts (4).
   - c. Hold two screws (3). Tighten two nuts (4).
2. **Inspect (TI).**
3. **Secure access doors LN1 or LN2, T250L, T250R, T290L, T290R, and L325 (para 2-2-1).**

END OF TASK

Section III. COOLING SYSTEM MAINTENANCE

4-3-1. NO. 1 AND NO. 2 ENGINE LOUVER ACTUATOR REMOVAL 4-3-1

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanics	5180-00-323-4692

Personnel Required:

67R10 Attack Helicopter Repairer

Equipment Conditions:

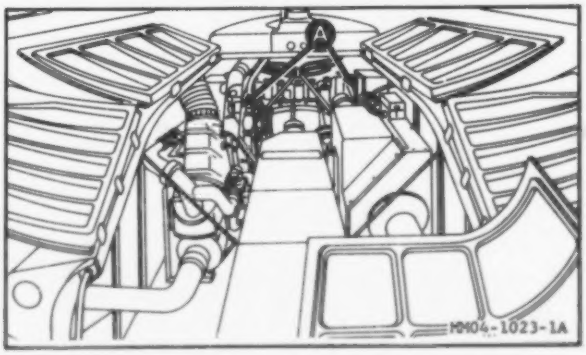
Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access doors T250L, T250R, T290L, T290R, and L325 opened

NOTE

This task is typical for No. 1 and No. 2 engine louver actuator.

A. **REMOVAL**

1. **Enter pilot station (para 1-7-1). Observe all safety precautions.**
2. **Open ENG LVR circuit breaker on pilot forward circuit breaker panel.**



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4-3-1. NO. 1 AND NO. 2 ENGINE LOUVER ACTUATOR REMOVAL (cont) 4-3-1

3. **Disconnect air inlet hose (1) from louver actuator (2).**

    a. Hold union (3).

    b. Remove hose nut (4).

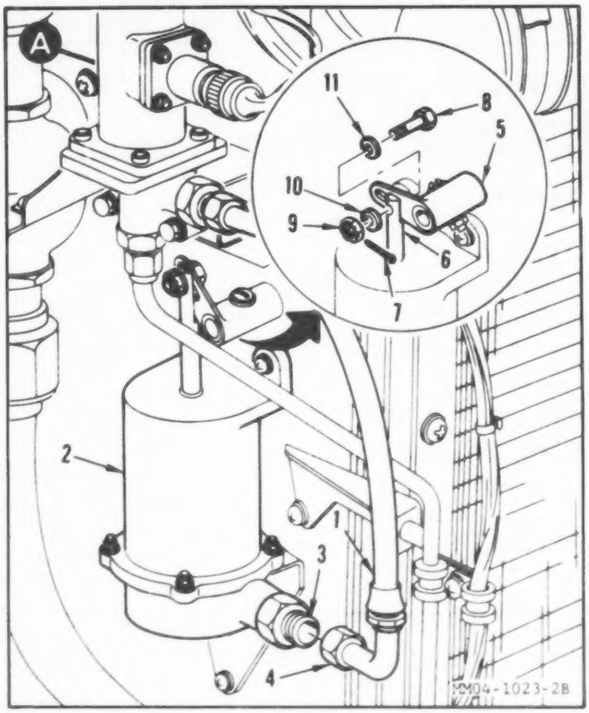
4. **Disconnect louver arm (5) from actuator shaft (6).**

    a. Remove and discard cotter pin (7).

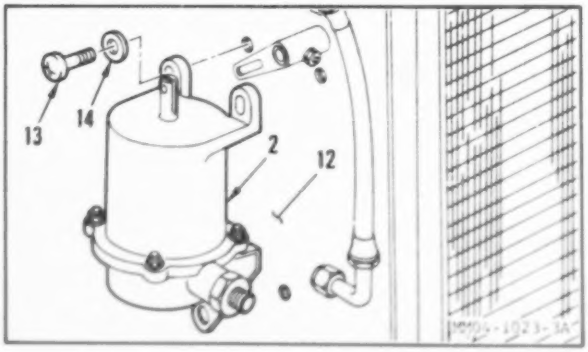
    b. Hold bolt (8).

    c. Remove nut (9) and washer (10).

    d. Remove bolt (8) and washer (11).



5. **Remove actuator (2) from louver(12).** Remove three screws(13) and washers (14).



B. **CLEANING**

Clean actuator mounting surface on louver (para 1-5-36).

C. **INSPECTION**

1. **Check actuator mounting surface on louver for cracks.** None allowed.

2. **Check louver for corrosion** (para 1-5-38).

END OF TASK

4-3-2. NO. 1 AND NO. 2 ENGINE LOUVER ACTUATOR INSTALLATION 4-3-2

This task covers: A. INSTALLATION B. ADJUSTMENT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanics	5180-00-323-4692
Aviation Ground Power Unit (AGPU)	1730-01-144-1897
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Materials/Parts:

	Cotter Pin
(E16)	Petrolatum

Personnel Required:

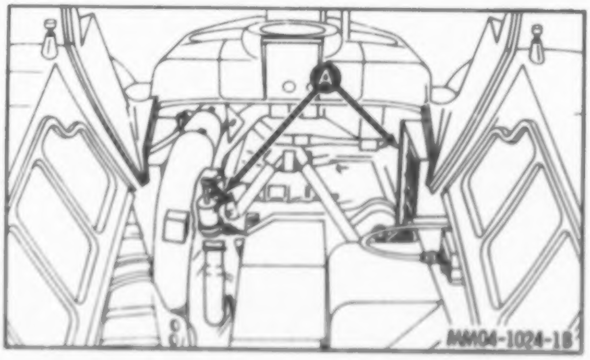
67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access doors T250L, T250R, T290L, T290R, and L325 opened

NOTE

This task is typical for No. 1 and No. 2 engines louver actuator installation.



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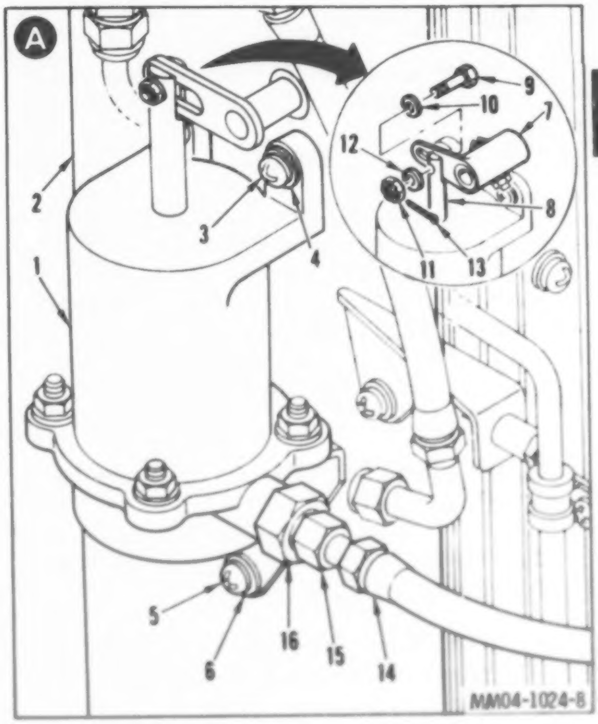
4-3-2. NO. 1 AND NO. 2 ENGINE LOUVER ACTUATOR INSTALLATION (cont) 4-3-2

A. INSTALLATION



NOTE

Do not tighten mounting screws until adjusted.

1. **Mount louver actuator (1) on louver (2).**
   - a. Install two washers (4) and long screws (3) into louver (2) through actuator top mounting slots.
   - b. Install washer (6) and short screw (5) through bottom slot.
2. **Connect louver arm (7) to actuator shaft (8).**
   - a. Install washer (10) and bolt (9) through shaft (8) and arm (7).
   - b. Hold bolt (9).
   - c. Install washer (12) and nut (11).
   - d. Install new cotter pin (13).
3. **Install AGPU outlet hose (14) to actuator (1).** Torque hose nut (15) to 60 INCH-POUNDS.
   - a. Lubricate threads of union (16). Use petrolatum (E16).
   - b. Install hose nut (15) on union (16).
   - c. Hold union (16).
   - d. Torque hose nut (15) to 60 INCH-POUNDS.
4. **Inspect (TI).**

B. ADJUSTMENT

1. **Connect AGPU** (para 1-7-17).
2. **Enter pilot station** (para 1-7-1). **Observe all safety precautions.**

GO TO NEXT PAGE

4-3-2. NO. 1 AND NO. 2 ENGINE LOUVER ACTUATOR INSTALLATION (cont) 4-3-2

3. **Adjust actuator (1).**

   a. Move actuator (1) up or down to fully open louver vanes (17).

   WARNING

   If FIRE BTL PRI-RES switch is set off-center during this task, extinguish system will discharge. Keep FIRE BTL switch centered. If injury occurs, seek medical aid.

   b. Pull ENG FIRE PULL 1 or 2 handle (18).

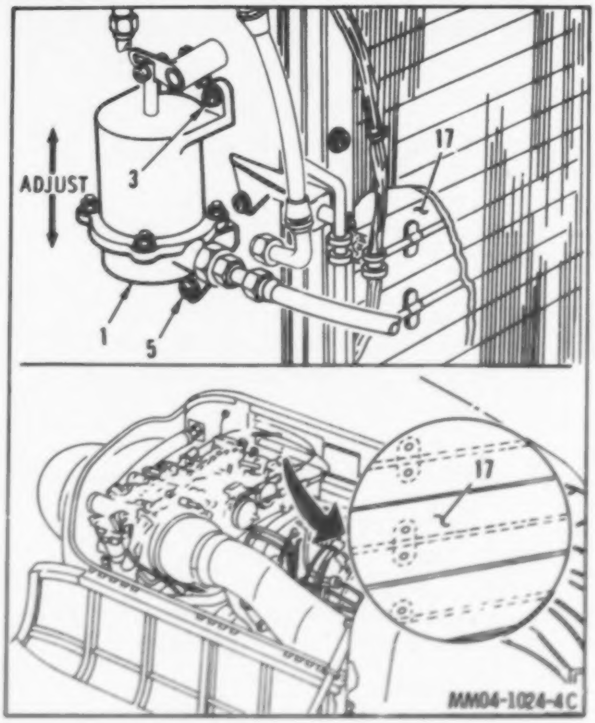
   c. Move actuator (1) up or down to close louver vanes (17).

   d. Tighten three actuator mounting screws (3) and (5).

   e. Push ENG FIRE PULL handle (18). Louver vanes (17) must open.

   f. Pull and push ENG FIRE PULL handle (18) three times.

   g. When handle is pulled, verify that stops (19) and (20) are contacted by closed vanes (17). If louver vanes do not properly close and open, loosen screws (3) and (); repeat adjustment step .


ADJUST
3
17
1
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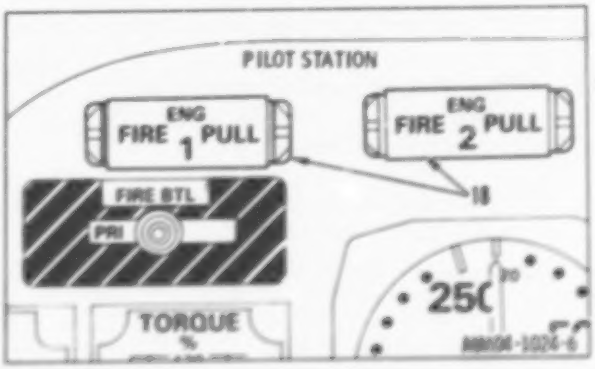
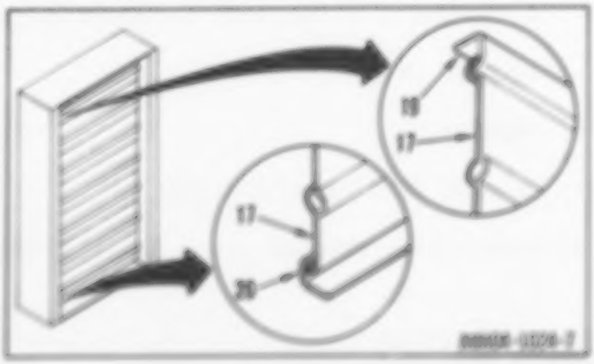
17
MM04-1024-4C


PILOT STATION
FIRE ENG 1 PULL
FIRE ENG 2 PULL
FIRE BTL
PRI
18
TORQUE
%
250
MM04-1024-6


19
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MM04-1024-7

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4-3-2. NO. 1 AND NO. 2 ENGINE LOUVER ACTUATOR INSTALLATION (cont) 4-3-2

4. Disconnect AGPU outlet hose (14) from actuator (1).

   a. Shut off AGPU. Remove hose (14).

   b. Hold union (16) and remove nut (15).

5. Connect air inlet hose (21) to actuator (1). Torque nut (22) to 60 INCH-POUNDS.

   a. Install nut (22) on union (16).

   b. Hold union (16).

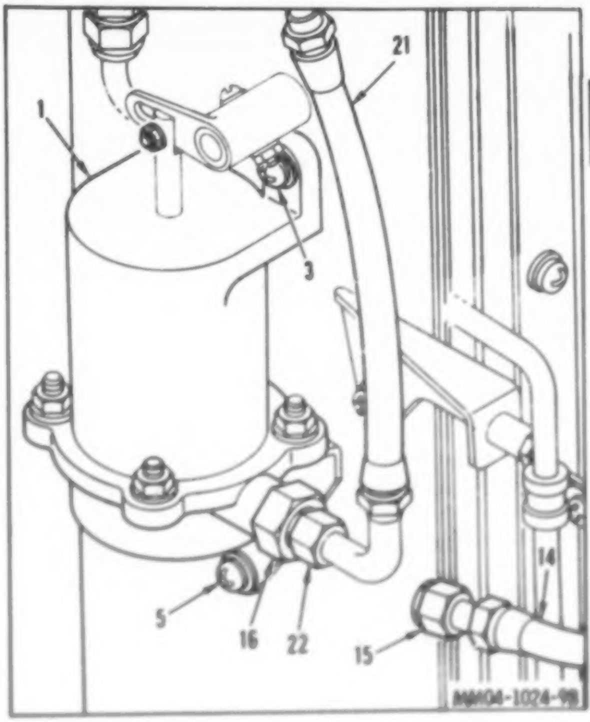
   c. Torque nut (22) to 60 INCH-POUNDS.

6. Inspect (TI).

7. Disconnect AGPU (para 1-7-17).

8. Perform fire extinguisher operational check (TM 55-1520-238-T).

9. Secure access doors T250L, T250R, T290L, T290R, L325, and LN1 or RN1 (para 2-2-2).



END OF TASK

4-3-3. NO. 1 ENGINE LOUVER REMOVAL 4-3-3

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

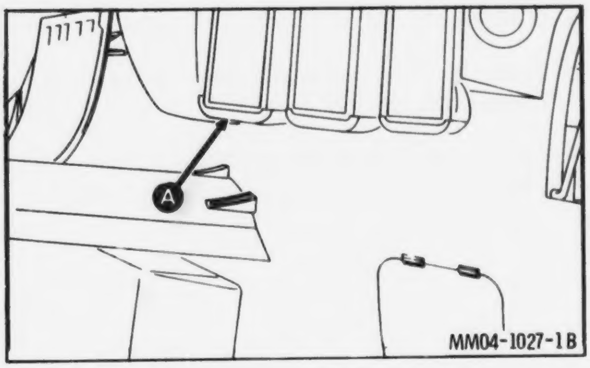
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanics	5180-00-323-4692

Personnel Required:

67R10 Attack Helicopter Repairer

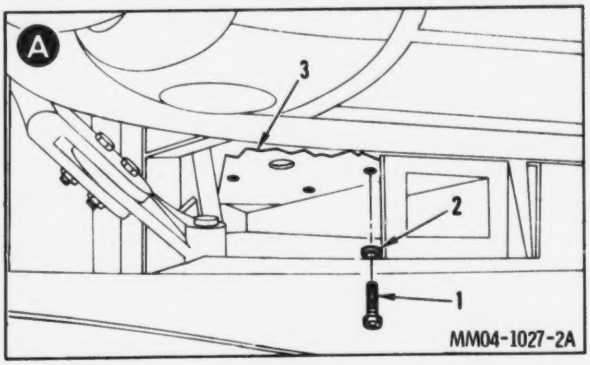
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access doors T250L, T250R, T290L, T290R, and L325 opened; panels L200 and fairing L230 removed
13-2-7	Air duct 2 removed
13-2-9	Air duct 3 removed
2-3-10	Forward catwalk panel removed
1-4-20	Main transmission oil system drained
6-3-6	Left heat exchanger removed
4-3-11	No. 1 engine louver directional control shutoff valve removed



A. REMOVAL

1. **Remove screws (1) and washers (2) from louver support (3).**



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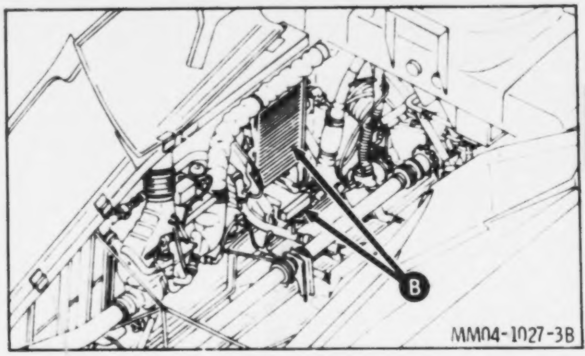
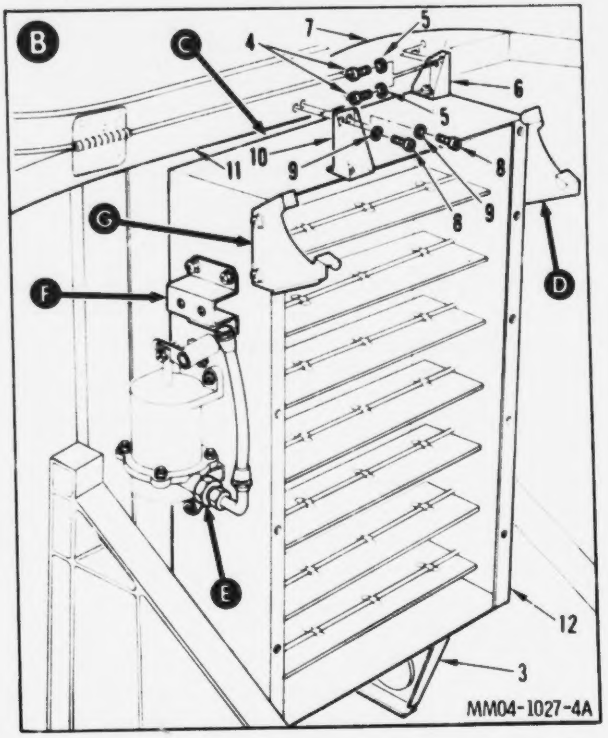
4-3-3. NO. 1 ENGINE LOUVER REMOVAL (cont)


B
MM04-1027-3B

2. Remove two screws (4) and washers (5) from mount bracket (6) and frame (7).

3. Remove two screws (8) and washers (9) from mounting bracket (10) and door support (11).

4. Remove louver (12) from support (3). Slide louver (12) inboard. Remove louver (12).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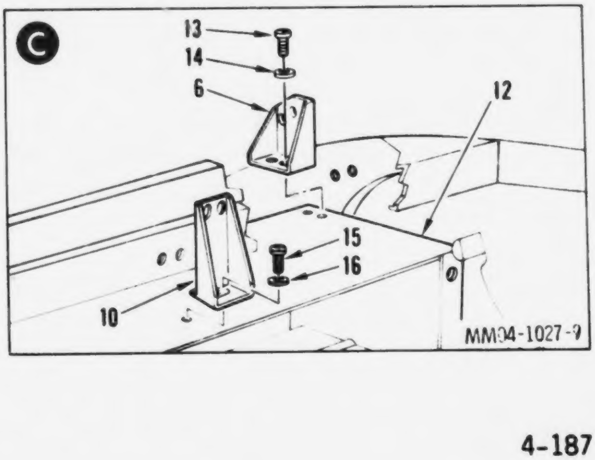
MM04-1027-4A

5. Remove mounting bracket (6) from louver (12). Remove two screws (13) and two washers (14).

6. Remove mounting bracket (10) from louver (12). Remove screw (15) and washer (16).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MM04-1027-9

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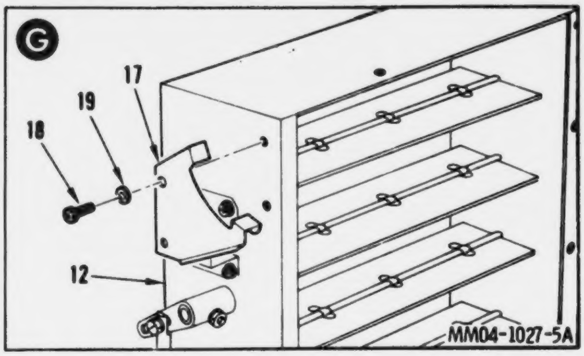
4-3-3. NO. 1 ENGINE LOUVER REMOVAL (cont) 4-3-3

7. **Remove duct bracket (17) from louver (12).** Remove two screws (18) and washers (19).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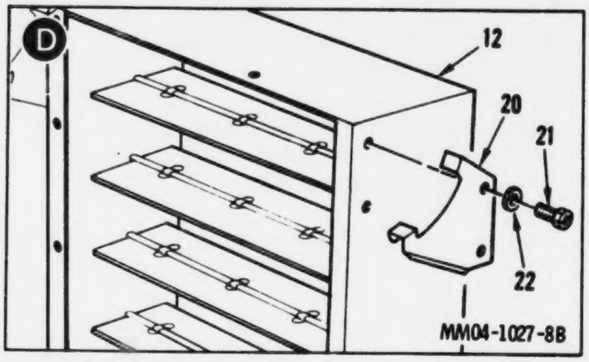
MM04-1027-5A

8. **Remove duct bracket (20) from louver (12).** Remove two screws (21) and washers (22).


D
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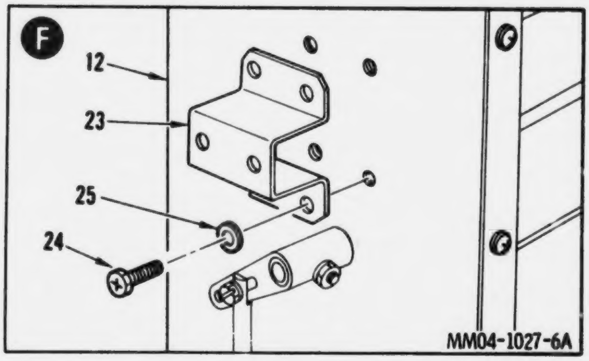
MM04-1027-8B

9. **Remove valve bracket (23) from louver (12).** Remove four screws (24) and washers (25).


F
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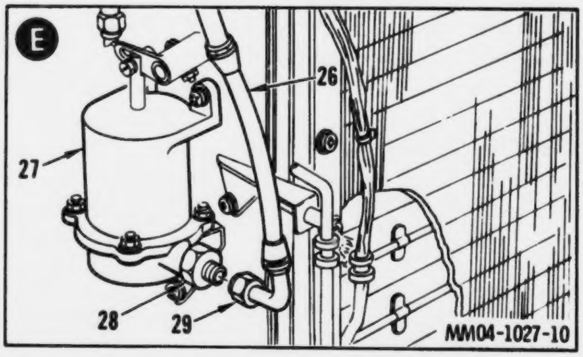
MM04-1027-6A

10. **Remove hose (26) from actuator (27).** Hold union (28). Remove hose nut (29).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MM04-1027-10

B. **CLEANING**

Clean supports, brackets, and frame (para 1-5-36).

C. **INSPECTION**

1. **Check supports and brackets for cracks.** None allowed.

2. **Check supports and brackets, and frame for corrosion** (para 1-5-38).

3. **Check cooling louver interior surfaces and vertical channels for faded or chipped paint** (TM 55-1500-345-23). No damaged areas larger than 1/4 square inch are permissible in areas within 1/4 inch either side of louver pivot shaft centerline with louvers closed.

END OF TASK

4-3-4. NO. 1 ENGINE LOUVER INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanics	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Materials/Parts

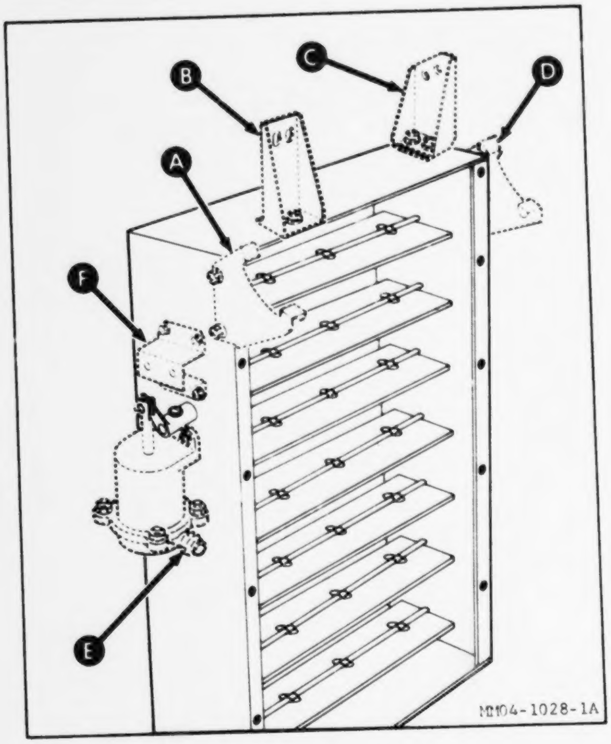
(E16) Petrolatum

Personnel Required:

67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



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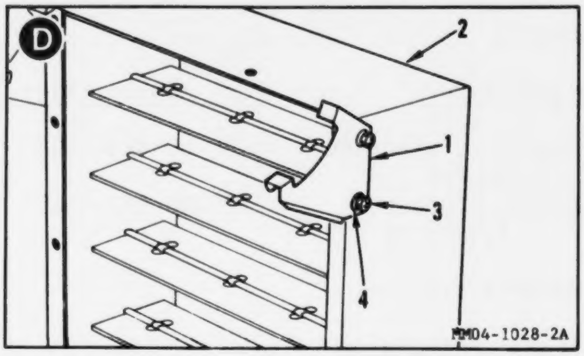
4-3-4. NO. 1 ENGINE LOUVER INSTALLATION (cont) 4-3-4

1. **Install duct bracket (1) on louver assembly (2).** Install washers (4) and screws (3).


D
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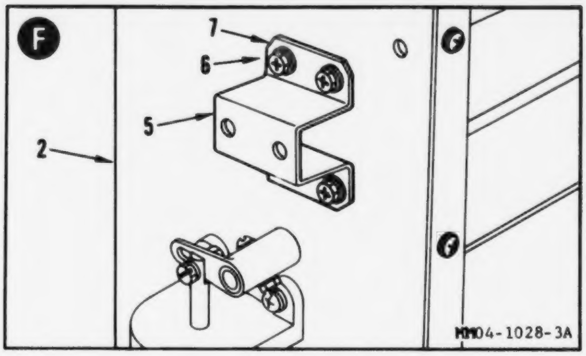
MM04-1028-2A

2. **Install valve bracket (5) on louver (2).** Install four washers (7) and screws (6).

3. **Install duct bracket (8) on louver (2).** Install two washers (10) and screws (9) .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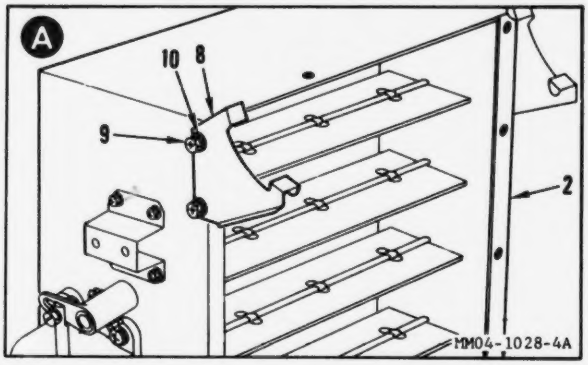
MM04-1028-3A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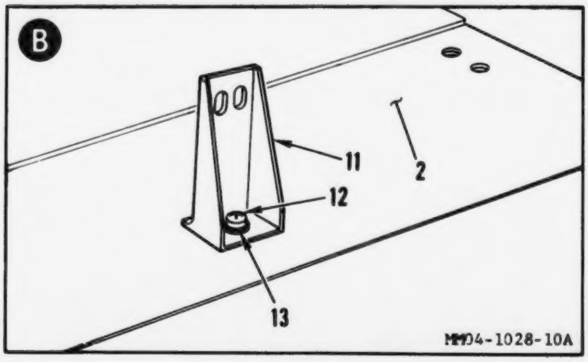
MM04-1028-4A

4. **Install mounting bracket (11) on louver (2).** Install washer (13) and screw (12).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MM04-1028-10A

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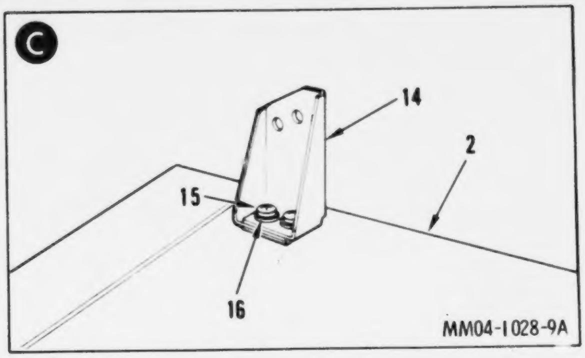
4-3-4. NO. 1 ENGINE LOUVER INSTALLATION (cont) 4-3-4

5. **Install mounting bracket (14) on louver (2).** Install two washers (16) and screws (15) .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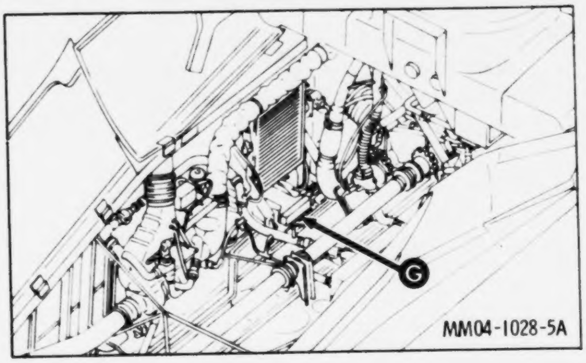
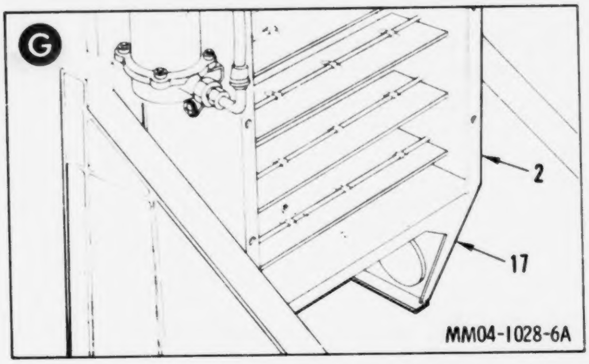
MM04-1028-9A


G
MM04-1028-5A

6. **Aline louver (2) on support (17).** Slide louver (2) outboard and position on louver support (17).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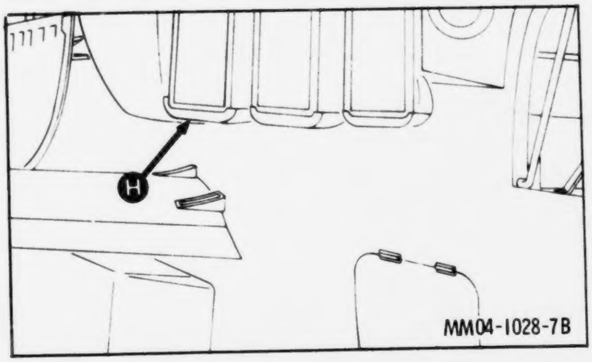
MM04-1028-6A


H
MM04-1028-7B

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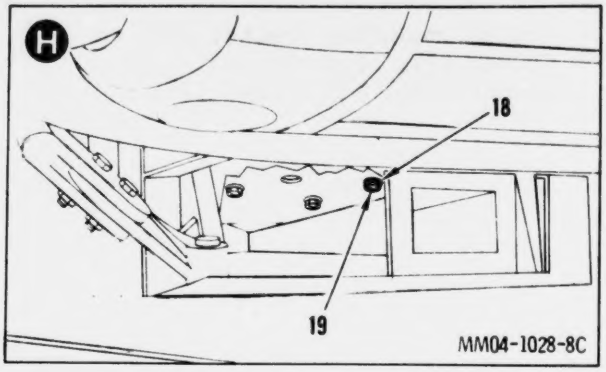
4-3-4. NO. 1 ENGINE LOUVER INSTALLATION (cont) 4-3-4

7. Install five washers (18) and screws (19) .


H
18
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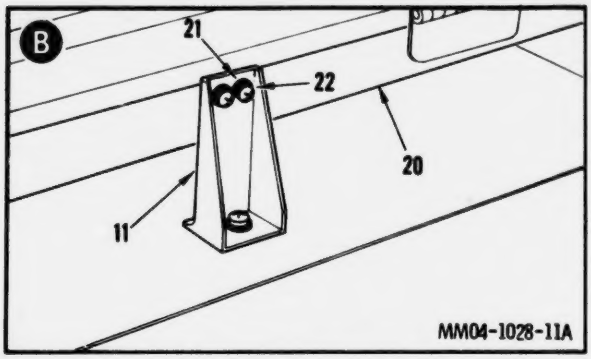
MM04-1028-8C

8. Install bracket (11) on door support (20). Install two washers (21) and screws (22).


B
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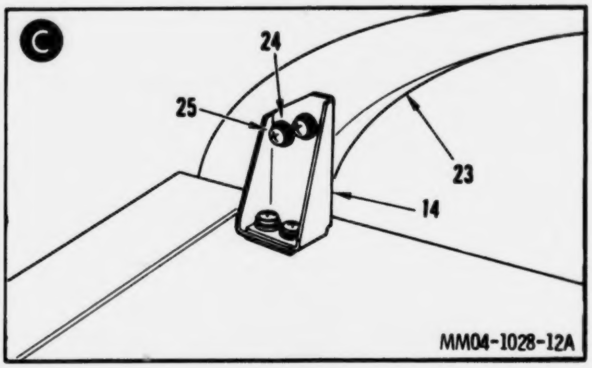
MM04-1028-11A

9. Install bracket (14) on frame (23). Install two washers (24) and screws (25).


C
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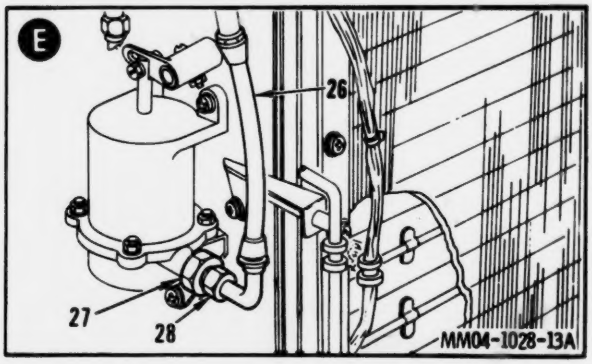
MM04-1028-12A

10. Connect actuator hose (26).
    a. Lubricate threads of union (27). Use petrolatum (E16).
    b. Install hose nut (28) on union (27).
11. Inspect (TI).


E
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MM04-1028-13A

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4-3-4. NO. 1 ENGINE LOUVER INSTALLATION (cont)

12. Install No. 1 engine louver directional control shutoff valve (para 4-3-11).
13. Install left heat exchanger (para 6-3-7).
14. Service main transmission oil system (para 1-5-20).
15. Install forward catwalk panel (para 2-3-11).
16. Install air duct 3 (para 13-2-10).
17. Install air duct 2 (para 13-2-8).
18. Adjust No. 1 engine louver actuator (para 4-3-2).
19. Secure fairing L230, panel L200, and doors T250L, T250R, T290L, T290R, and L325 (para 2-2-2).

END OF TASK

4-3-5. NO. 2 ENGINE LOUVER REMOVAL 4-3-5

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

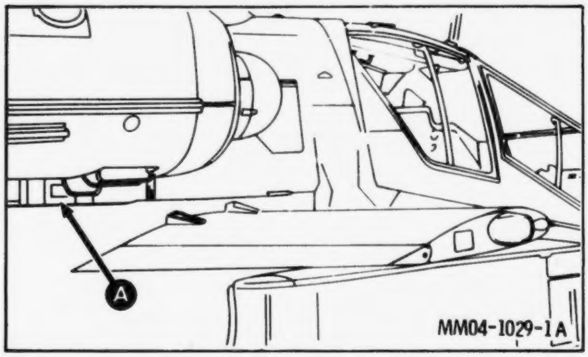
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanics	5180-00-323-4692

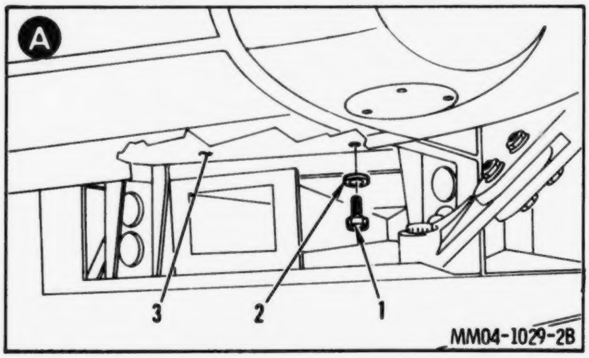
Personnel Required:

67R10 Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access doors T250L, T250R, T290L, T290R, and L325 opened; panels R200 and fairing R230 removed
15-2-2	APU enclosure removed
2-3-10	Forward catwalk panel removed
6-2-16	No. 7 drive shaft and anti-flail removed
1-5-20	Main transmission oil system drained
6-3-6	Right heat exchanger removed
4-3-11	No. 2 engine louver directional control shutoff valve removed





A. REMOVAL

1. **Remove five screws (1) and washers (2) from louver support (3).**

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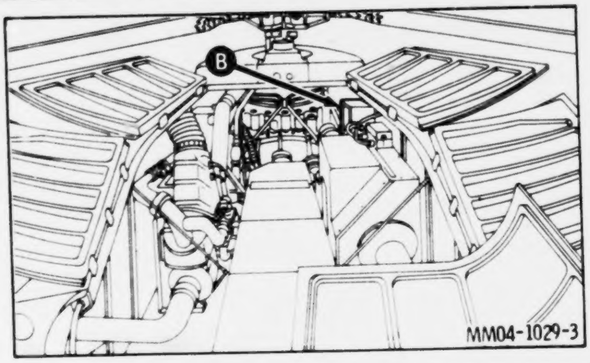
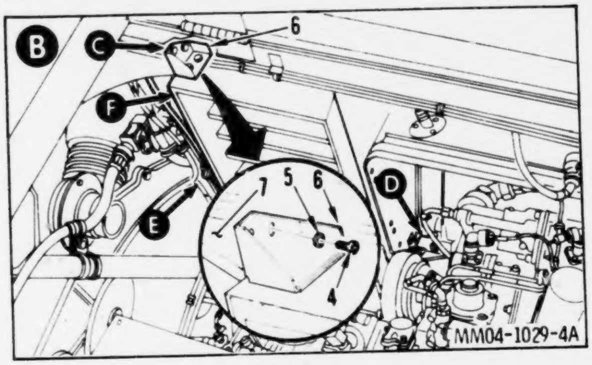
4-3-5. NO. 2 ENGINE LOUVER REMOVAL (cont)


B
MM04-1029-3

2. **Remove two screws (4) and washers (5) from mounting bracket (6) and frame (7).**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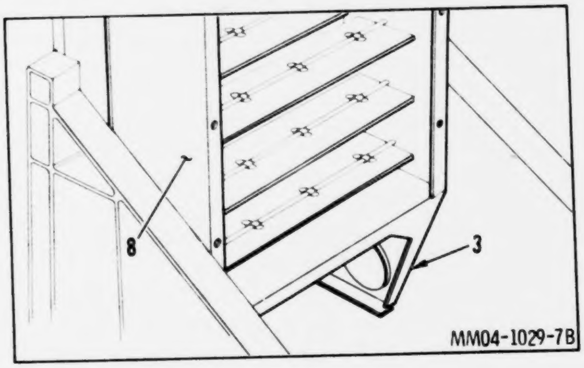
3. **Remove louver (8) from support (3).** Slide louver (8) inboard. Remove louver (8).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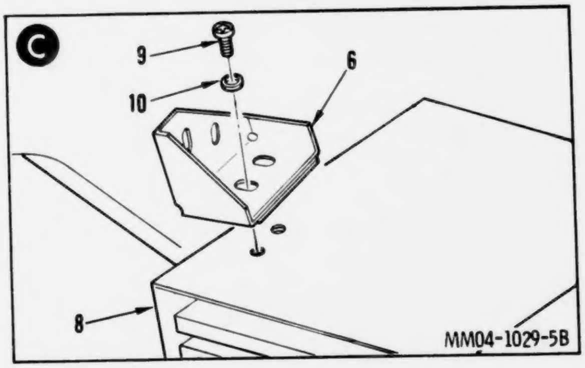
4. **Remove mounting bracket (6) from louver (8).** Remove two screws (9) and washers (10).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MM04-1029-5B

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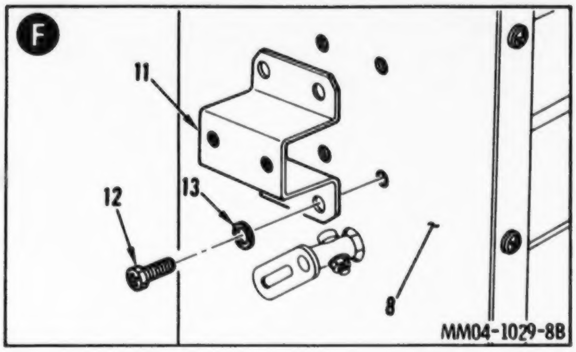
4-3-5. NO. 2 ENGINE LOUVER REMOVAL (cont) 4-3-5

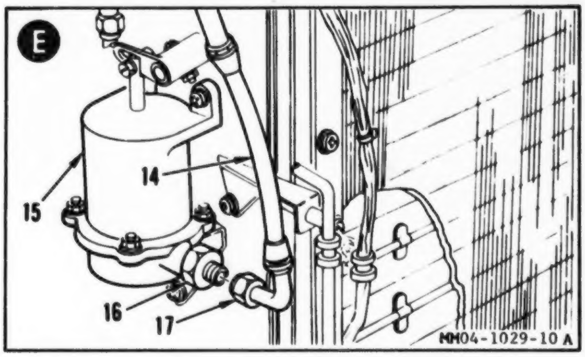
5. **Remove valve bracket (11) from louver (8).** Remove four screws (12) and washers (13).



6. **Remove hose (14) from actuator (15).**

   a. Hold union (16).

   b. Remove hose nut (17).



B. **CLEANING**

Clean brackets and frame (para 1-5-36).

C. **INSPECTION**

1. **Check brackets and supports for cracks.** None allowed.

2. **Check brackets and supports for corrosion** (para 1-5-38).

3. **Check cooling louver interior surfaces and vertical channels for faded or chipped paint** (TM 55-1500-345-23). No damaged areas larger than 1/4 square inch are permissible in areas within 1/4 inch either side of louver pivot shaft centerline with louvers closed.

END OF TASK

4-3-6. NO. 2 ENGINE LOUVER INSTALLATION 4-3-6

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanics	5180-00-323-4692

Materials/Parts:

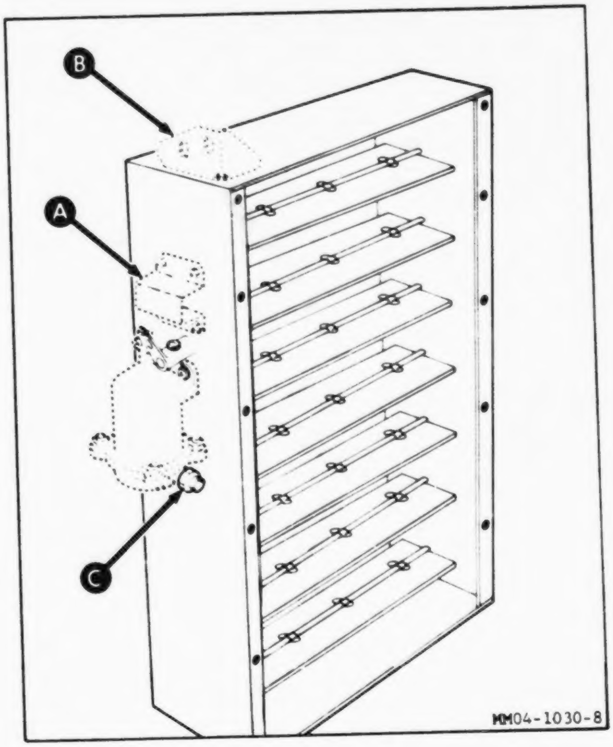
(E16) Petrolatum

Personnel Required:

67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



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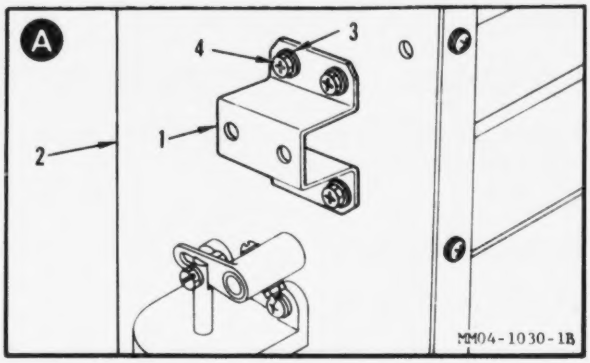
4-3-6. NO. 2 ENGINE LOUVER INSTALLATION (cont) 4-3-6

1. **Install valve bracket (1) on louver (2).** Install four washers (3) and screws (4).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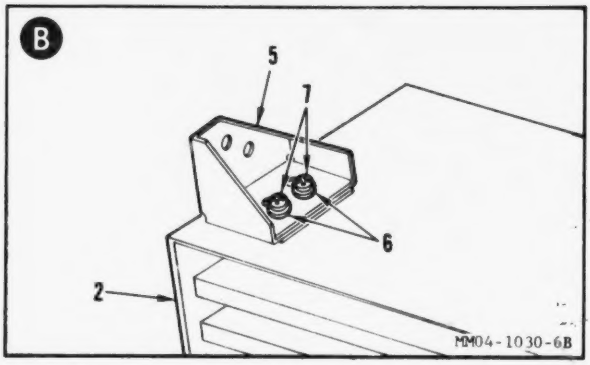
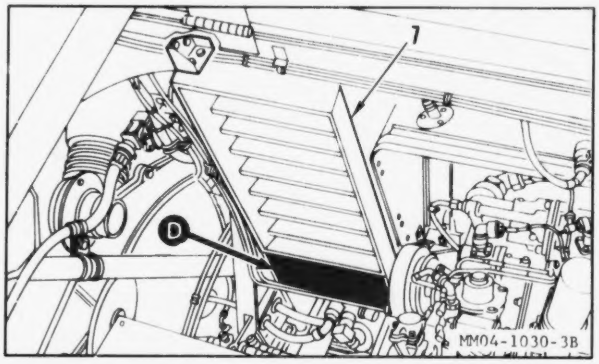
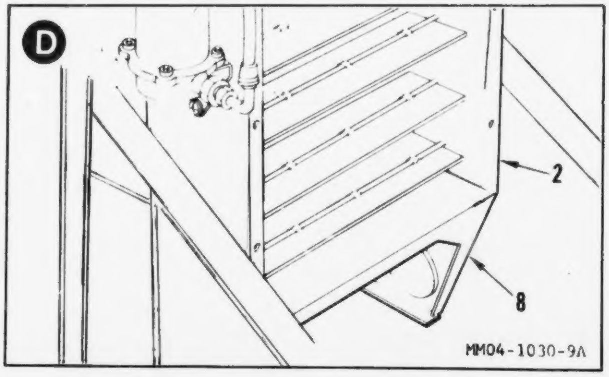
MM04-1030-1B

2. **Install mounting bracket (5) on louver (2).** Install two washers (6) and screws (7).


B
5
7
6
2
MM04-1030-6B

3. **Aline louver (2) on support (8).** Slide louver (2) outboard on louver support (8).


7
D
MM04-1030-3B


D
2
8
MM04-1030-9A

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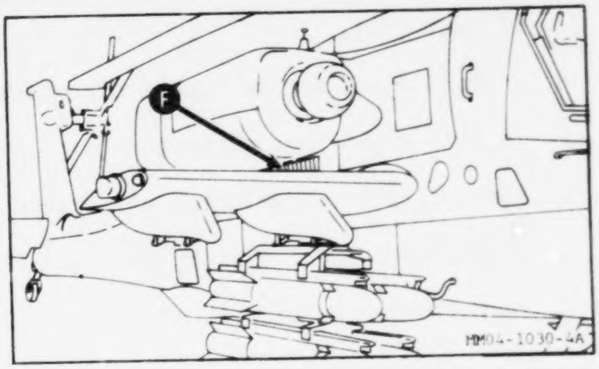
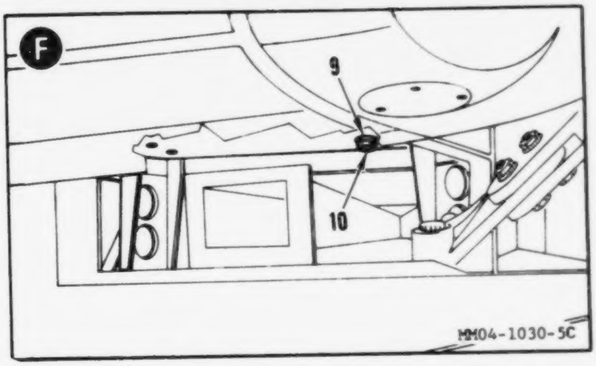
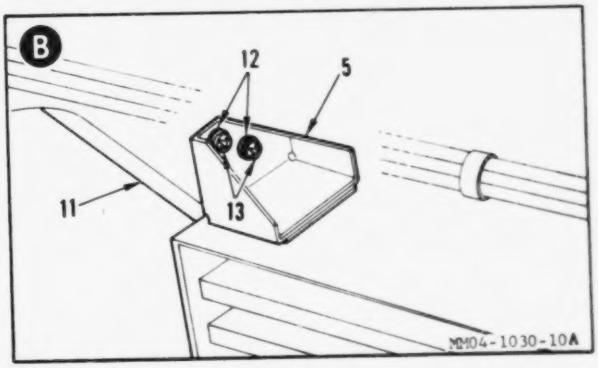
4-3-6. NO. 2 ENGINE LOUVER INSTALLATION (cont) 4-3-6


F
MM04-1030-4A

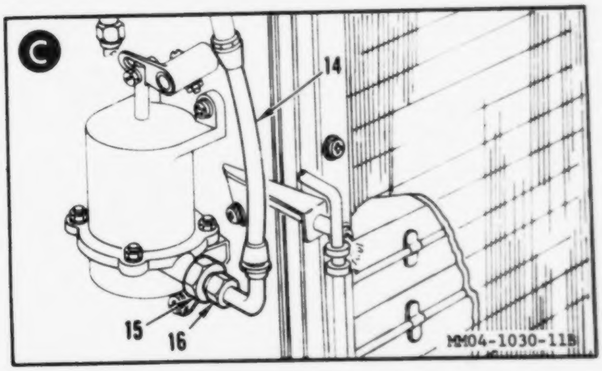
4. Install five washers (9) and screws (10).


F
9
10
MM04-1030-5C

5. Install mounting bracket (5) on frame (11). Install two washers (12) and screws (13).


B
12
5
11
13
MM04-1030-10A

6. Connect actuator hose (14).
   a. Lubricate threads of union (15). Use petrolatum (E16).
   b. Install hose nut (16) on union (15).


C
14
15
16
MM04-1030-11B

GO TO NEXT PAGE

7. **Inspect (TI).**
8. **Install No. 2 engine louver directional control shutoff valve** (para 4-3-11).
9. **Install right heat exchanger** (para 6-3-7).
10. **Service main transmission oil system** (para 1-5-20).
11. **Install No. 7 drive shaft and anti-flail** (para 6-2-16).
12. **Install forward catwalk panel** (para 2-3-10).
13. **Install APU enclosure** (para 15-2-3).
14. **Adjust No. 2 engine louver actuator** (para 4-3-2).
15. **Secure fairing R230, panel R200, and doors T250L, T250R, T290L, T290R, and L325** (para 2-2-2).

END OF TASK

4-3-7. NO. 1 ACTUATING CYLINDER REMOVAL/INSTALLATION 4-3-7

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanics	5180-00-323-4692

Material/Parts:

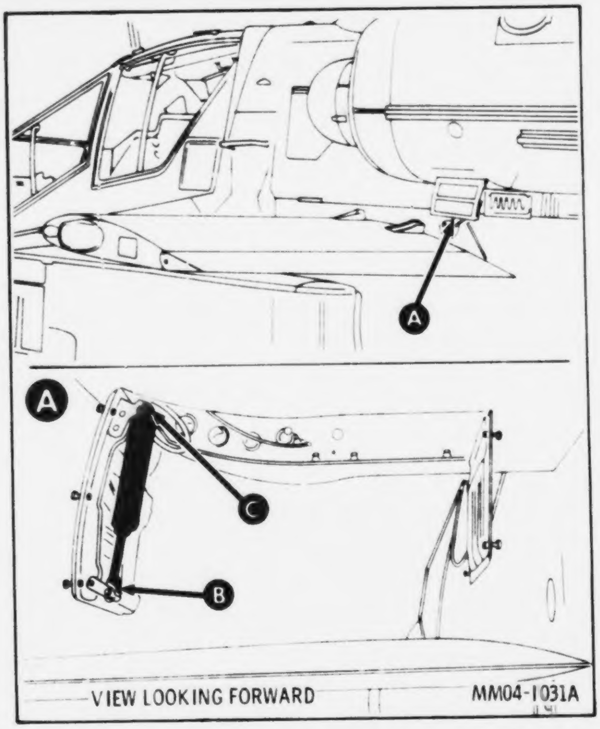
	Cotter Pin (2)
(E16)	Petrolatum

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access doors LN3 and LN4 opened



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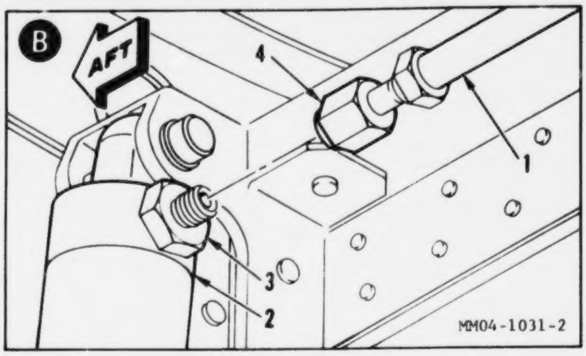
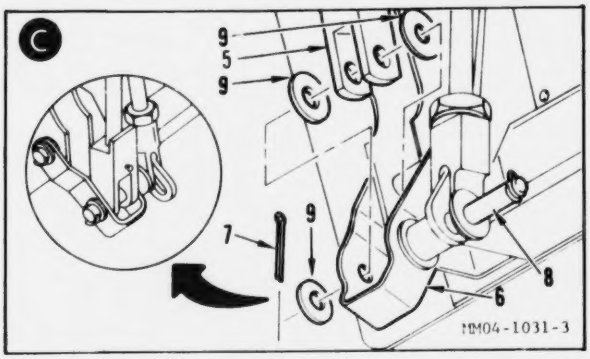
4-3-7. NO. 1 ACTUATING CYLINDER REMOVAL/INSTALLATION (cont) 4-3-7

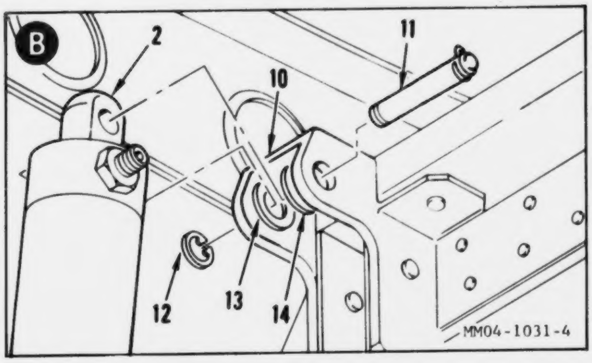
A. REMOVAL


B
AFT
4
1
3
2
MM04-1031-2

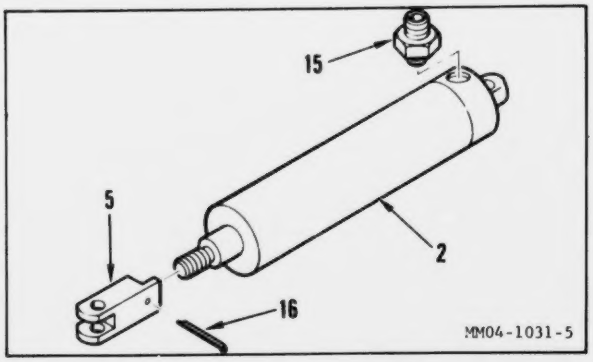
1. **Disconnect air hose (1) from actuator (2).** Hold union (3) and remove nut (4).


C
9
5
9
7
9
8
6
MM04-1031-3

2. **Remove clevis (5) from idler (6)**
   - a. Remove and discard aft cotter pin (7
   - b. Pull pin (8) slowly forward until clevis (5) and three washers (9) are clear.
   - c. Push pin (8) aft until seated in idler (6).


B
2
11
10
12
13
14
MM04-1031-4

3. **Remove actuator (2) from bracket (10).**
   - a. Hold pin (11).
   - b. Remove retaining ring (12).
   - c. Remove pin (11), spacer (13), and spacer (14).


15
5
2
16
MM04-1031-5

4. **Remove union (15) from actuator (2).**
5. **Remove clevis (5) from actuator (2).** Remove and discard cotter pin (16).

GO TO NEXT PAGE

4-3-7. NO. 1 ACTUATING CYLINDER REMOVAL/INSTALLATION (cont)

B. CLEANING

Wipe all removed and attaching parts with a clean rag.

C. INSPECTION

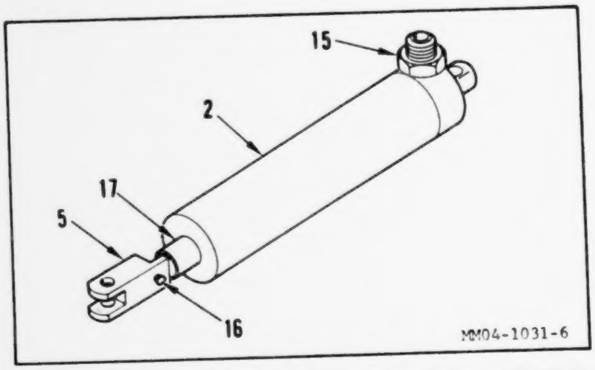
Check actuator, clevis and union for:

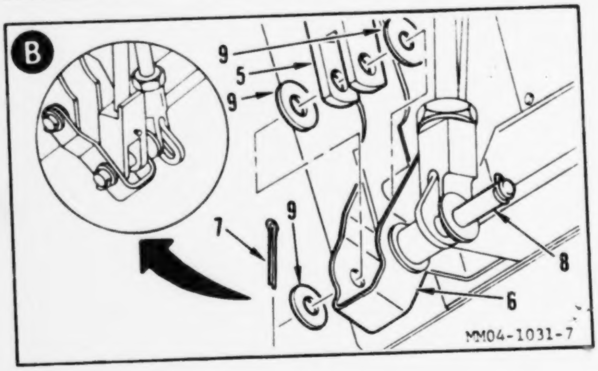
a. Cracks and stripped threads. None allowed.

b. Corrosion (para 1-5-38).

D. INSTALLATION

1. Install clevis (5) on actuator (2).
2. Install new cotter pin (16) through clevis (5) and rod (17).
3. Lubricate tapered threads of union (15). Use petrolatum (E16).
4. Install tapered end of union (15) in actuator (2).
5. Install actuator clevis end (5) in idler (6).
   - a. Pull pin (8) forward until clear of idler (6).
   - b. Position and hold clevis (5) in idler (6).
   - c. Install clevis (5) in idler (6) with one washer (9) on each side.
   - d. Push pin (8) through washers (9) and clevis (5) until seated in idler (6).
   - e. Install washer (9) on pin (8) aft of idler (6).
   - f. Install new cotter pin (7) in pin (8).





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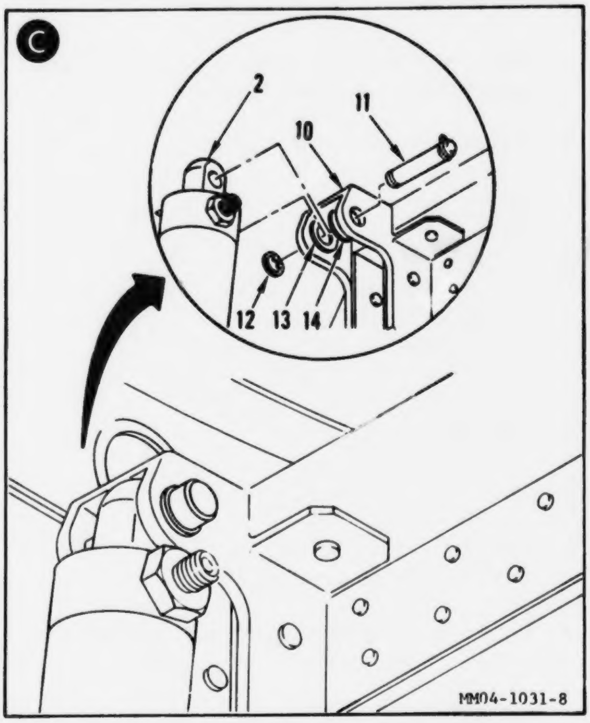
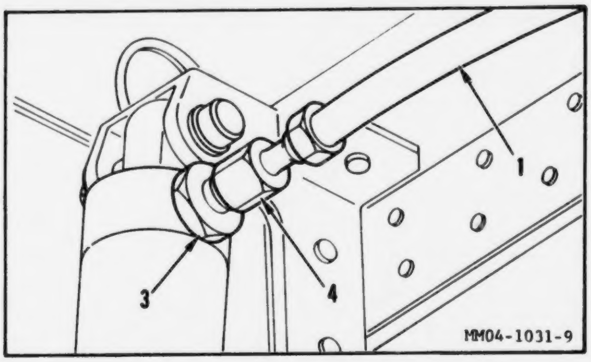
4-3-7. NO. 1 ACTUATING CYLINDER REMOVAL/INSTALLATION (cont) 4-3-7

6. **Install actuator (2) in bracket (10).**
    - a. Position and hold actuator (2) in bracket (10).
    - b. Install pin (11) through bracket (10), spacer (13), actuator (2), spacer (14), and bracket (10).
    - c. Install ring (12) on pin (11).



7. **Connect air hose (1) to union (3).**
    - a. Lubricate threads on union (3). Use petrolatum (E16).
    - b. Install nut (4).
8. **Inspect (TI).**
9. **Secure access doors LN3 and LN4 (2-2-2).**



END OF TASK

4-3-8. NO. 2 ACTUATING CYLINDER REMOVAL 4-3-8

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

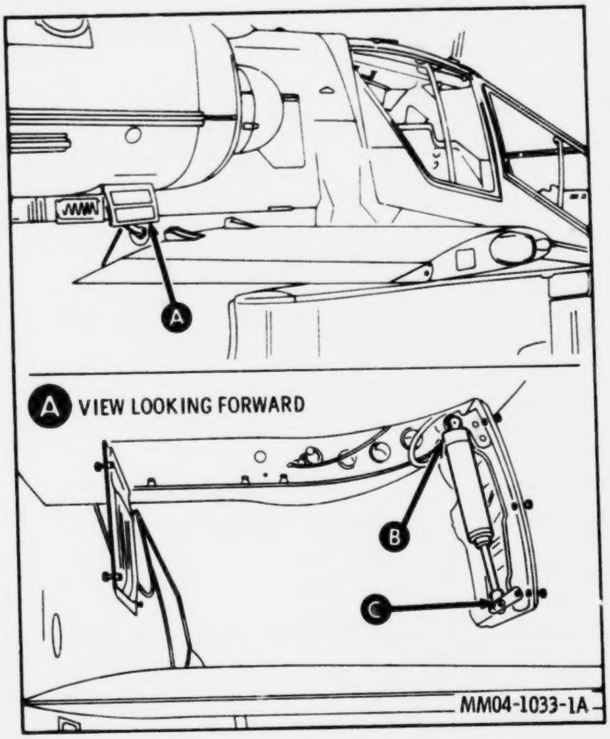
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanics	5180-00-323-4692

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access doors RN3 and RN4 opened

Personnel Required:

67R10 Attack Helicopter Repairer



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4-3-8. NO. 2 ACTUATING CYLINDER REMOVAL (cont) 4-3-8

A. REMOVAL

1. **Disconnect air hose (1) from actuator (2).** Hold union (3) and remove nut (4).

2. **Remove clevis (5) from idler (6).**

   a. Remove and discard aft cotter pin (7).

   b. Pull pin (8) slowly forward until clevis (5) and three washers (9) are free.

   c. Push pin (8) aft until seated in idler (6).

3. **Remove actuator (2) from bracket (10).**

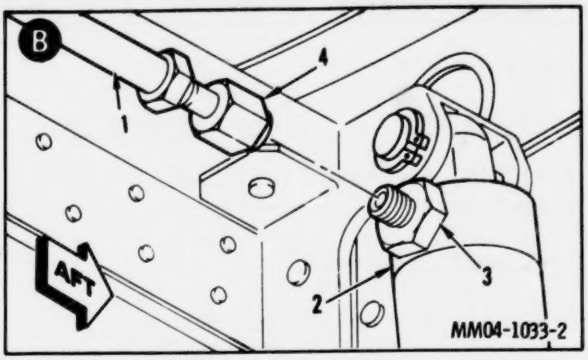
   a. Hold pin (11).

   b. Remove retaining ring (12).

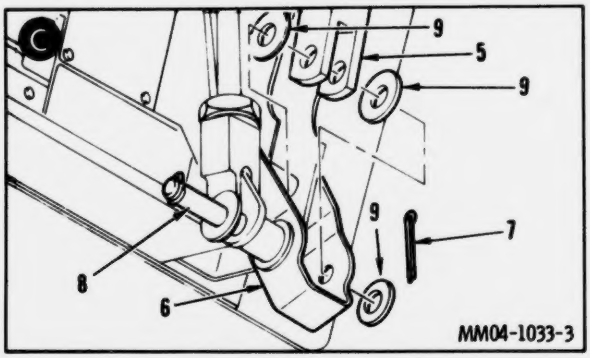
   c. Remove pin (11) and spacers (13) and (14).

4. **Remove union (15) from actuator (2).**

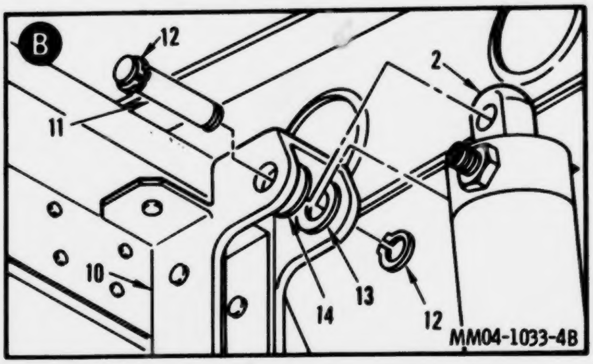
5. **Remove clevis (5) from actuator (2).** Remove and discard cotter pin (16).



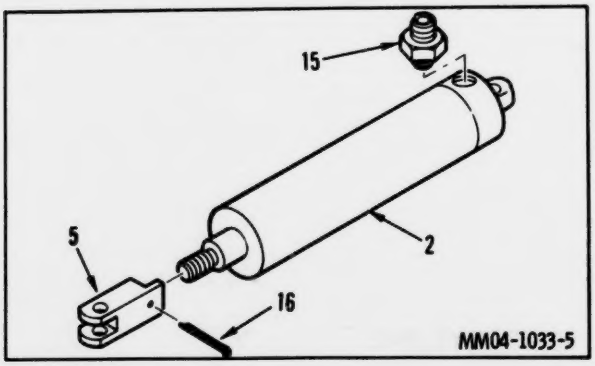
MM04-1033-2



MM04-1033-3



MM04-1033-4B



MM04-1033-5

B. CLEANING

Wipe all removed and attaching parts with a clean rag.

C. INSPECTION

Check actuator, clevis, and union for:

   a. Cracks and stripped threads. None allowed.

   b. Corrosion (para 1-5-38).

END OF TASK

4-3-9. NO. 2 ACTUATING CYLINDER INSTALLATION 4-3-9

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanics	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Wrench, Torque 3/8 Drive	5120-00-288-8865

Materials/Parts:

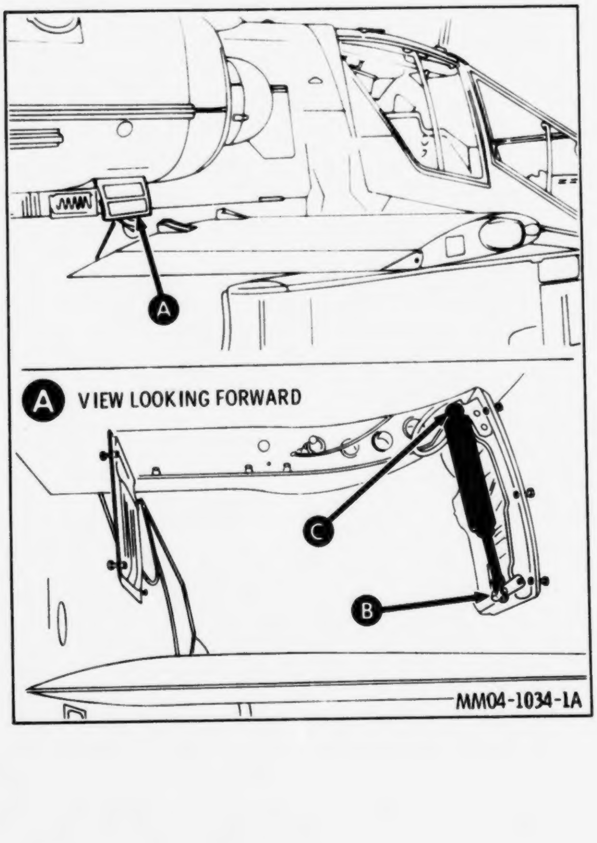
	Cotter Pin (2)
(E16)	Petrolatum

Personnel Required:

67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access doors RN3 and RN4 opened



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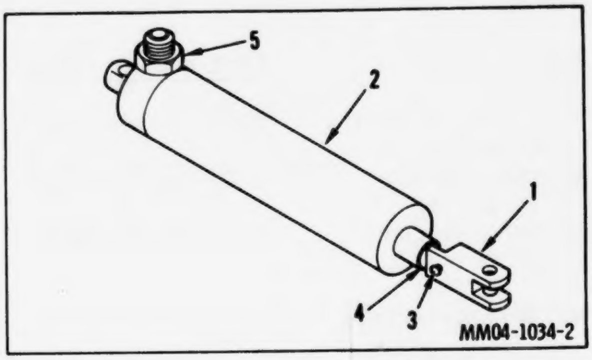
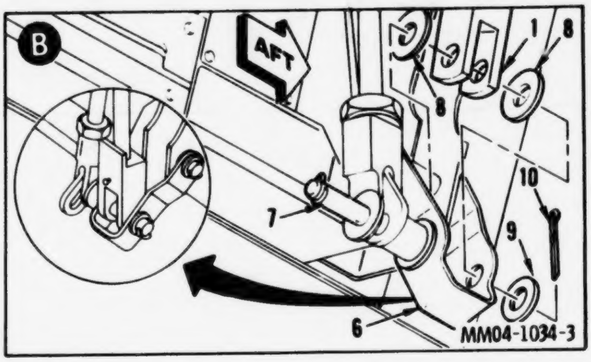
4-3-9. NO. 2 ACTUATING CYLINDER INSTALLATION (cont) 4-3-9





1. **Install clevis (1) on actuator (2).**
2. **Install new cotter pin (3) through clevis (1) and rod (4).**
3. **Lubricate tapered threads of union (5).** Use petrolatum (E16).
4. **Install tapered end of union (5) in actuator (2).**
5. **Install actuator clevis end (1) in idler (6).**
   - a. Pull pin (7) forward until clear of idler (6).
   - b. Position and hold clevis (1) in idler (6).
   - c. Install clevis (1) in idler (6) with one washer (8) on each side.
   - d. Push pin (7) through washers (8) and clevis (1) until seated in idler (6).
   - e. Install washer (9) on pin (7) aft of idler (6).
   - f. Install new cotter pin (10) in pin (7).

GO TO NEXT PAGE

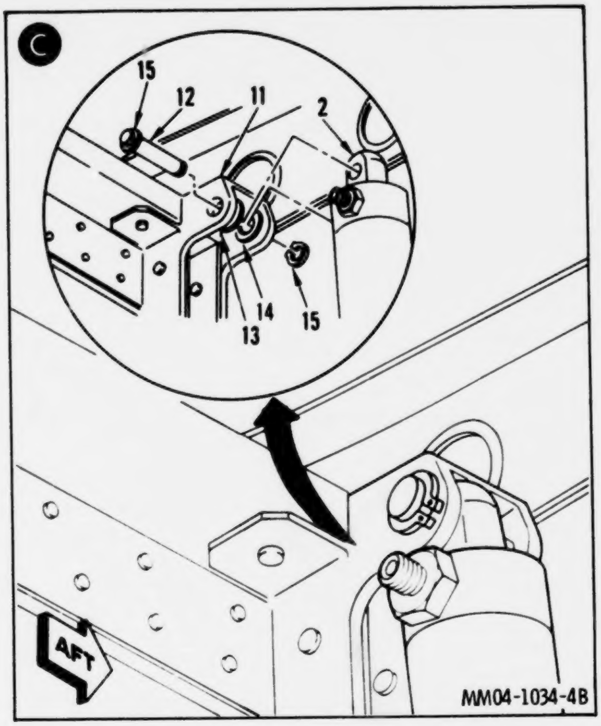
4-3-9. NO. 2 ACTUATING CYLINDER INSTALLATION (cont) 4-3-9

6. **Install actuator (2) in mounting bracket (11).**

   a. Position and hold actuator (2) in bracket (11).

   b. Install pin (12) through bracket (11), spacer (13), actuator (2), spacer (14), and bracket (11).

   c. Install ring (15) on bolt (12).


C
15
12
11
2
14
13
15
AFT
MM04-1034-4B

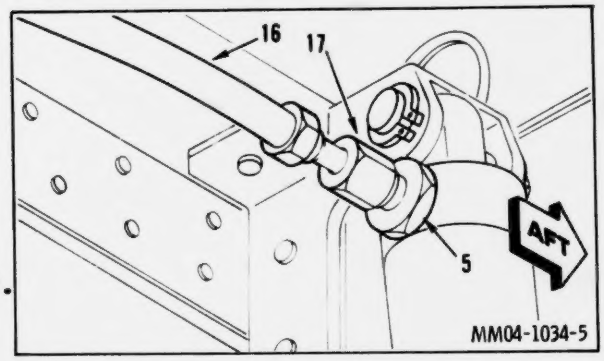
7. **Connect air hose (16) to union (5).**

   a. Lubricate threads on union (5). Use petrolatum (E16).

   b. Install nut (17).

8. **Inspect (TI).**

9. **Secure access doors RN3 and RN4 (2-2-2).**


16
17
5
AFT
MM04-1034-5

END OF TASK

4-3-10. NO. 1 OR NO. 2 ENGINE LOUVER ACTUATOR HOSE REPLACEMENT 4-3-10

This task covers: A. REMOVAL B. INSPECTION C. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanics	5180-00-323-4692

Materials/Parts:

(E16) Petrolatum

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

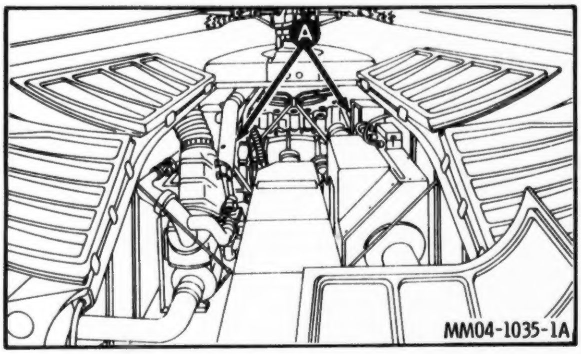
Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access doors T250L, T250R, T290L, T290R, and L325 opened

NOTE

This task is typical for No. 1 or No. 2 engine louver actuator hoses.

A. REMOVAL

1. **Enter pilot station (para 1-7-1). Observe all safety precautions.**
2. **Open ENG LVR circuit breaker on pilot forward circuit breaker panel.**



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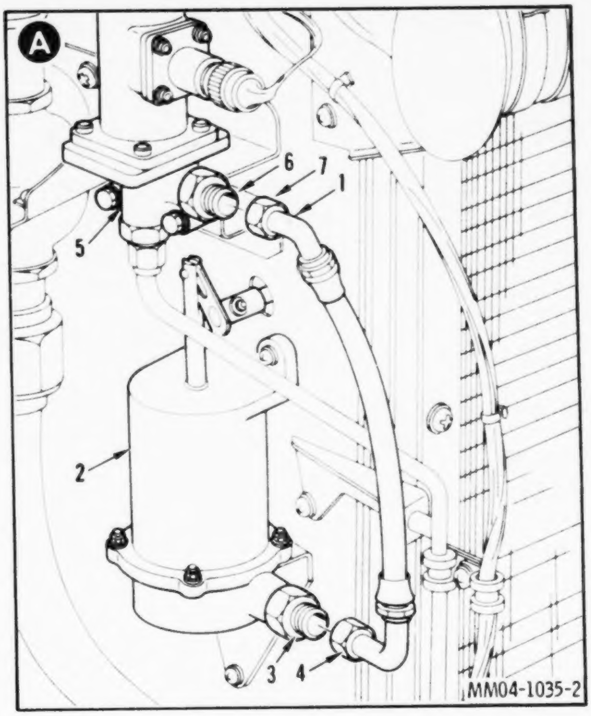
4-3-10. NO. 1 OR NO. 2 ENGINE LOUVER ACTUATOR HOSE REPLACEMENT (cont) 4-3-10



3. **Disconnect hose (1) from louver actuator (2).** Hold union (3). Remove nut (4).
4. **Disconnect hose (1) from shutoff valve (5).** Hold union (6). Remove nut (7).
5. **Remove hose (1).**

B. **INSPECTION**

Check unions (3) and (6) for stripped threads. None allowed.

C. **INSTALLATION**

1. **Connect hose (1) to louver actuator (2).**
    a. Lubricate threads on union (3). Use petrolatum (E16).
    b. Install nut (4) on union (3).
2. **Connect hose (1) to shutoff valve (5).**
    a. Lubricate threads on union (6). Use petrolatum (E16).
    b. Install nut (7) on union (6).
3. **Inspect (TI).**
4. **Perform power plants operational check (engine 1 and engine 2)** (TM 55-1520-238-T).
5. **Secure access doors T250L, T250R, T290L, T290R, and L325** (para 2-2-2).

END OF TASK

4-3-11. NO. 1 OR NO. 2 ENGINE DIRECTIONAL CONTROL SHUTOFF VALVE REMOVAL/INSTALLATION 4-3-11

This task covers: A. REMOVAL B. INSPECTION C. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanics	5180-00-323-4692

Materials/Parts:

	Packing (2)
(E16)	Petrolatum

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access doors T250L, T250R, T290L, T290R, and L325 opened

NOTE

This task is typical for No. 1 or No. 2 engine directional control shutoff valves.

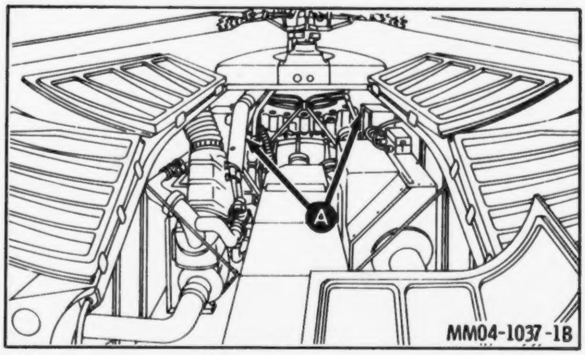
A. REMOVAL

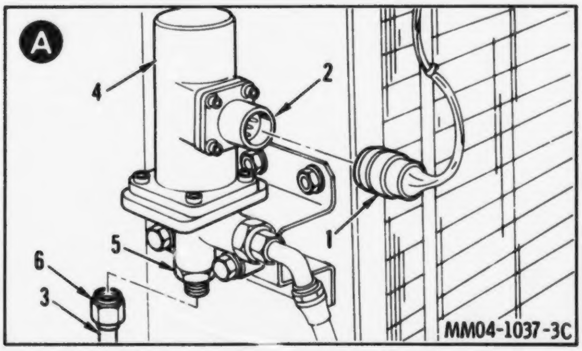
1. **Enter pilot station (para 1-7-1). Observe all safety precautions.**

2. **Open ENG LVR circuit breaker on pilot center circuit breaker panel.**

3. **Detach connector P62 (1) from No. 1 shutoff valve (4) connector L11J1 (2); or detach connector P63 from No. 2 shutoff valve (4) connector L12J1 (2).**

4. **Disconnect tube (3) from valve (4).** Hold union (5). Remove tube nut (6).





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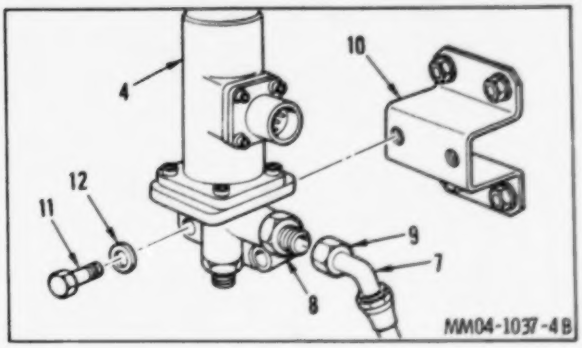
4-3-11. NO. 1 OR NO. 2 ENGINE DIRECTIONAL CONTROL SHUTOFF VALVE REMOVAL/INSTALLATION (cont) 4-3-11

5. **Disconnect hose (7) from valve (4).** Hold union (8). Remove tube nut (9).

6. **Remove valve (4) from mounting bracket (10).** Remove two bolts (11) and washers (12).

7. **Remove unions (5) and (8) from valve (4).** Remove and discard two packings (13).



B. CLEANING

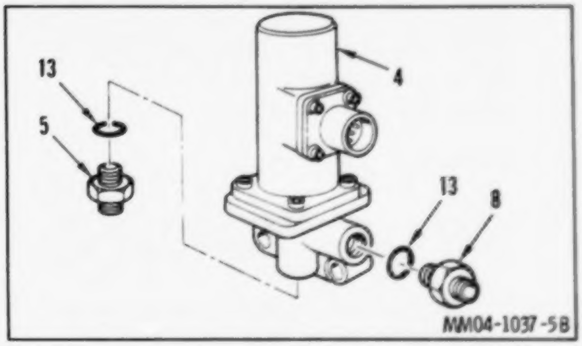
Wipe all removed and attaching parts with a clean rag.

C. INSPECTION

1. **Check bracket for cracks, and missing or loose hardware.** None allowed.

2. **Check valve for cracks.** None allowed.

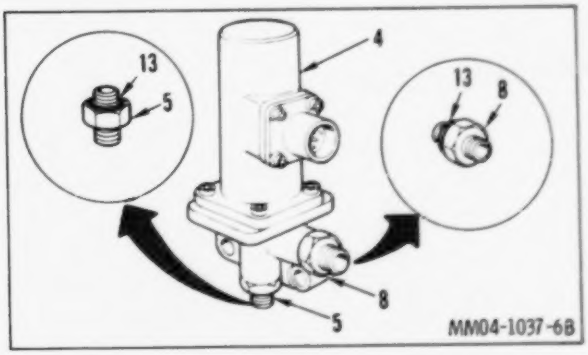
3. **Check bracket and valve for corrosion.**(para 1-5-38).



D. INSTALLATION

1. **Install two new packings (13) on unions (5) and (8).** Lubricate packings and threads of unions. Use petrolatum (E16).

2. **Install two unions (5) and (8) on valve (4).**



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4-3-11. NO. 1 OR NO. 2 ENGINE DIRECTIONAL CONTROL SHUTOFF VALVE REMOVAL/INSTALLATION (cont)

3. **Install valve (4) on bracket (10).** Install two washers (12) and bolts (11) through valve (4) into bracket (10).

4. **Connect tube (7) to union (8).** Install tube nut (9).

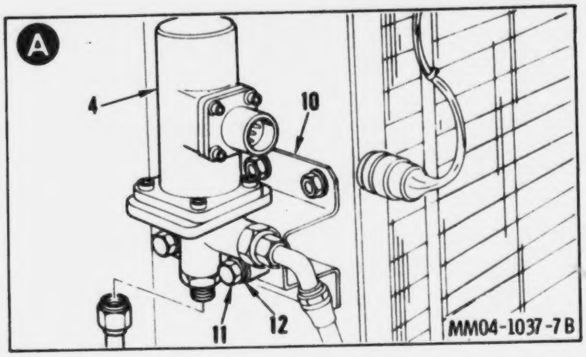
5. **Connect hose (3) to union (5).** Install tube nut (6).

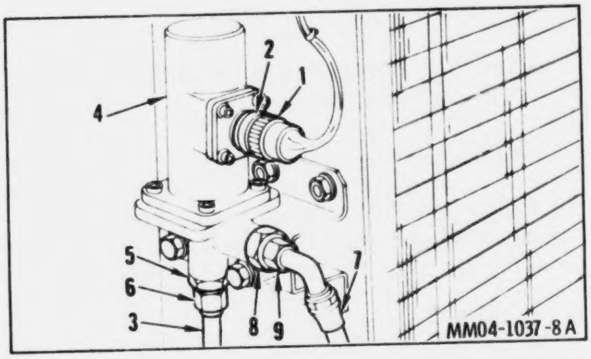
6. **Attach connector P62 (1) to No. 1 shutoff valve (4) connector L11J1 (2); or attach connector P63 (1) to No. 2 shutoff valve (4) connector L12J1 (2).**

7. **Inspect (TI).**

8. **Secure access doors T250R, T250L, T290R, T290L, and L325** (para 2-2-1).

9. **Perform power plants operational check (engine 1 and engine 2).**





END OF TASK

4-3-12. NO. 1 ENGINE LOUVER SUPPORT REMOVAL/INSTALLATION 4-3-12

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanics	5180-00-323-4692

Materials/Parts:

Packing with retainer (6)
Petrolatum (E16)

Personnel Required:

67R10 Attack Helicopter Repairer
66R30 Inspector/Supervisor

References:

TM 55-1520-204-25/1

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access doors T250L, T250R, T290L, T290R, and L325 opened; panels L200 and L230 removed
13-2-6	Air duct No. 2 removed
13-2-7	Air duct No. 3 removed
2-3-10	Forward catwalk panel removed
1-5-20	Main transmission oil system drained
6-3-5	Left heat exchanger removed
4-3-11	No. 1 engine directional control shutoff valve removed
4-3-3	No. 1 engine louver removed

A. REMOVAL

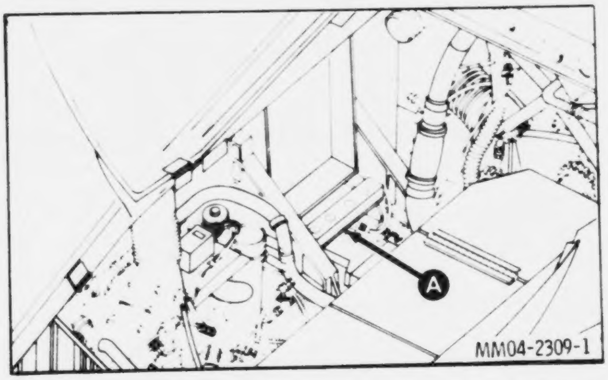
1. **Remove six screws (1) and packings with retainers (2) from louver support (3) and deck (4).** Discard packings with retainers (2).
2. **Remove screw (5), washer (6), nut (7), and clamp (8).**
3. **Slide louver support (3) inboard and lift from deck (4).**

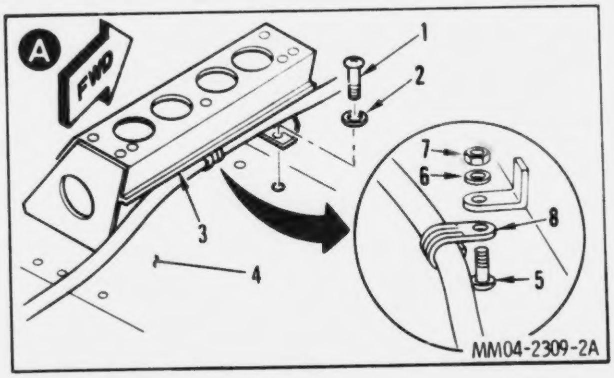
B. CLEANING

Clean louver support and support mounting surface on deck (para 1-5-36).

C. INSPECTION

1. **Check support mounting surface on deck for cracks.** (TM 55-1520-204-25/1).
2. **Check deck for corrosion** (para 1-5-38).





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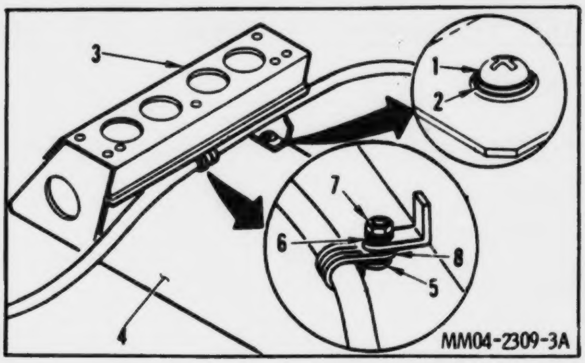
4-3-12. NO. 1 ENGINE LOUVER SUPPORT REMOVAL/INSTALLATION (cont) 4-3-12



D. INSTALLATION

1. Aline louver support (3) on deck (4).
2. Lubricate six new packings with retainers (2). Use petrolatum (E16).
3. Install six screws (1) and packings with retainers (2) through louver support (3) and deck (4).
4. Install clamp (8), screw (5), washer (6), and nut (7).
5. Inspect (TI).
6. Install No. 1 engine louver (para 4-3-4).
7. Install No. 1 engine directional control shutoff valve (para 4-3-11).
8. Install left heat exchanger (para 6-3-7).
9. Service main transmission oil system (para 1-5-20).
10. Install forward catwalk panel (para 2-3-10).
11. Install air duct 3 (para 13-2-7).
12. Install air duct 2 (para 13-2-6).
13. Secure fairing L230, panel L200, and doors T250L, T250R, T290L, T290R, and L325 (para 2-2-2).

END OF TASK

4-3-13. NO. 2 ENGINE LOUVER SUPPORT REMOVAL/INSTALLATION 4-3-13

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanics	5180-00-323-4692

Materials/Parts:

Packing with retainer (4)
Petrolatum (E16)

Personnel Required:

67R10 Attack Helicopter Repairer
66R30 Inspector/Supervisor

References:

TM 55-1520-204-25/1

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access doors T250L, T250R, T290L, T290R, and L325 opened; panels L200 and L230 removed
15-2-2	APU enclosure removed
2-3-10	Forward catwalk panel removed
6-2-18	No. 7 drive shaft and anti-flail drained
1-5-18	Main transmission oil system drained
6-3-5	Right heat exchanger removed
4-3	No. 2 engine directional control shutoff valve removed
4-3-7	No. 2 engine louver removed

A. REMOVAL

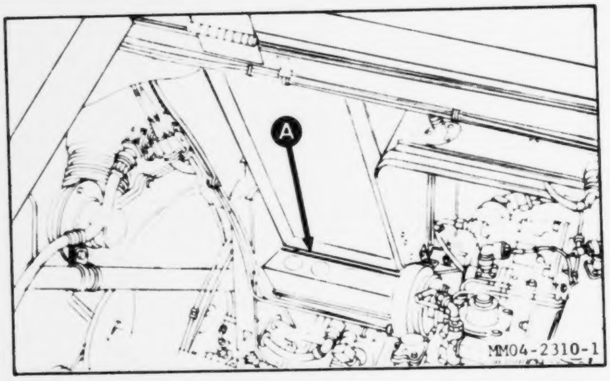
1. Remove four screws (1) and packings with retainers (2) from louver support (3) and deck (4). Discard packings with retainers.
2. Slide louver support (3) inboard and lift from deck (4).

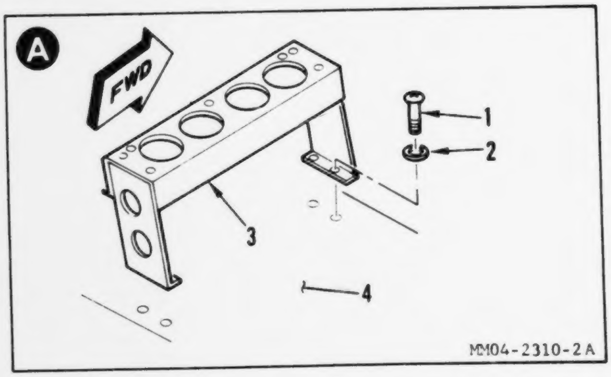
B. CLEANING

Clean louver support and support mounting surface on deck (para 1-5-36).

C. INSPECTION

1. Check support mounting surface on deck for cracks. (TM 55-1520-204-25/1).
2. Check deck for corrosion (para 1-5-38).





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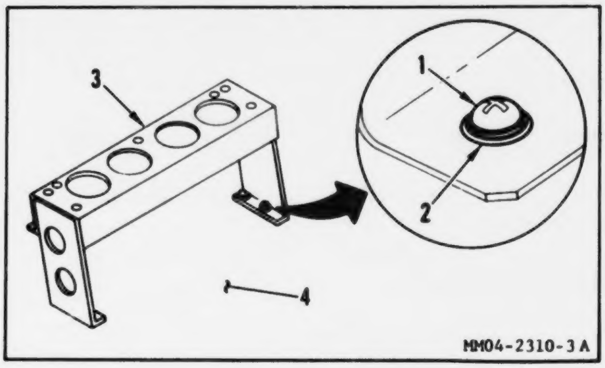
4-3-13. NO. 2 ENGINE LOUVER SUPPORT REMOVAL/INSTALLATION (cont) 4-3-13

B. INSTALLATION



1. Aline louver support (3) on deck (4).
2. Lubricate four new packings with retainers (2). Use petrolatum (E16).
3. Install four screws (1) and packings with retainers (2) through louver support (3) and deck (4).
4. Inspect (TI).
5. Install No. 2 engine louver (para 4-3-6).
6. Install No. 2 engine directional control shutoff valve (para 4-3-11).
7. Install right heat exchanger (para 6-3-7).
8. Service main transmission oil system (para 1-5-21).
9. Install No. 7 drive shaft and anti-flail (para 2-3-16).
10. Install forward catwalk panel (para 2-3-10).
11. Install APU enclosure (para 15-2-3).
12. Secure fairing L230, panel R200, and doors T250L, T250R, T290L, T290R, and L325 (para 2-2-2).

END OF TASK

4-3-14. NO. 1 OR NO. 2 ENGINE LOUVER DISASSEMBLY/ASSEMBLY (AVIM) 4-3-14

This task covers: A. DISASSEMBLY B. CLEANING C. INSPECTION D. ASSEMBLY

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Airframe Repairman's	5120-00-323-4876

Materials/Parts:

	Push on nut (14)
(E52)	Lubricant
(E19)	Primer

Personnel Required:

68610	Aircraft Structural Repairer
66R30	Inspector/Supervisor

References:

TM 55-1500-204-25/1
TM 55-1500-345-23

Equipment Conditions:

Ref	Condition
4-3-2	No. 1 or No. 2 engine louver actuator removed
4-3-3	No. 1 engine louver or
4-3-5	No. 2 engine louver removed
4-3-11	No. 1 engine directional control shutoff valve removed

A. DISASSEMBLY

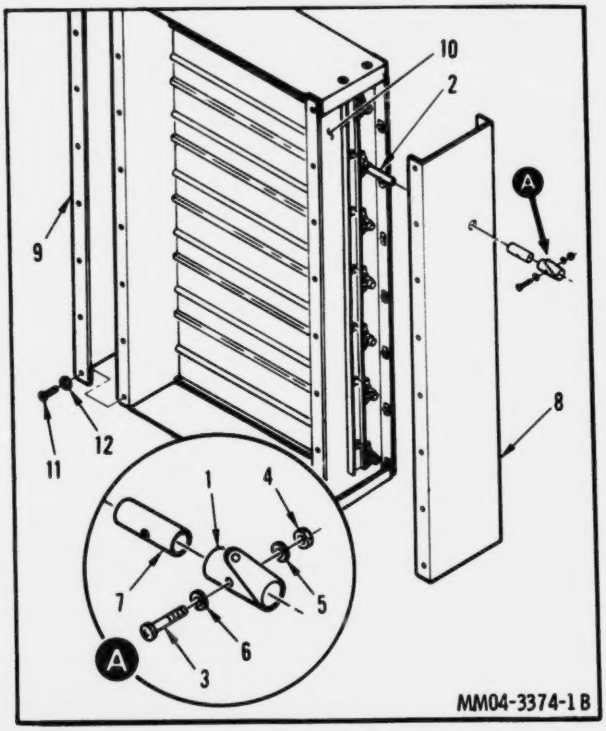
1. **Remove remote control lever (1) from louver vane shaft (2).**

   a. Hold screw (3). Remove nut (4) and washer (5).

   b. Remove screw (3) and washer (6).

   c. Remove remote control lever (1) and sleeve bushing (7) from louver vane shaft (2).

2. **Remove two louver covers (8) and (9) from louver channel (10).** Remove 32 screws (11) and washers (12).



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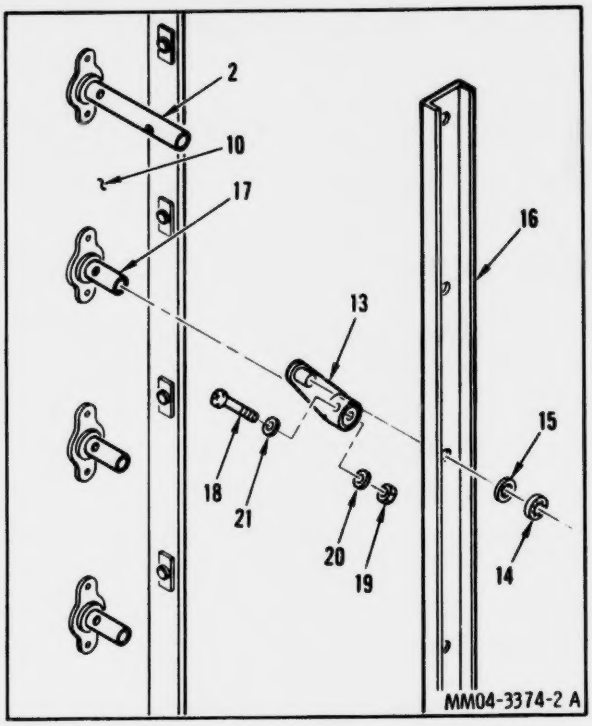
4-3-14. NO. 1 OR NO. 2 ENGINE LOUVER DISASSEMBLY/ASSEMBLY (AVIM) (cont) 4-3-14



3. **Remove seven remote control levers (13) from louver channel (10).**

   a. Remove and discard seven push-on nuts (14).

   b. Remove seven washers (15) from lever (13).

   c. Remove louver linkage channel (16) from levers (13).

   d. Remove seven levers (13) from louver vane shafts (2) and (17).

   e. Hold screws (18). Remove seven nuts (19) and washers (20).

   f. Remove seven screws (18) and washers (21).

   g. Remove seven remote control levers (13) from louver vane shafts (2), and (17).

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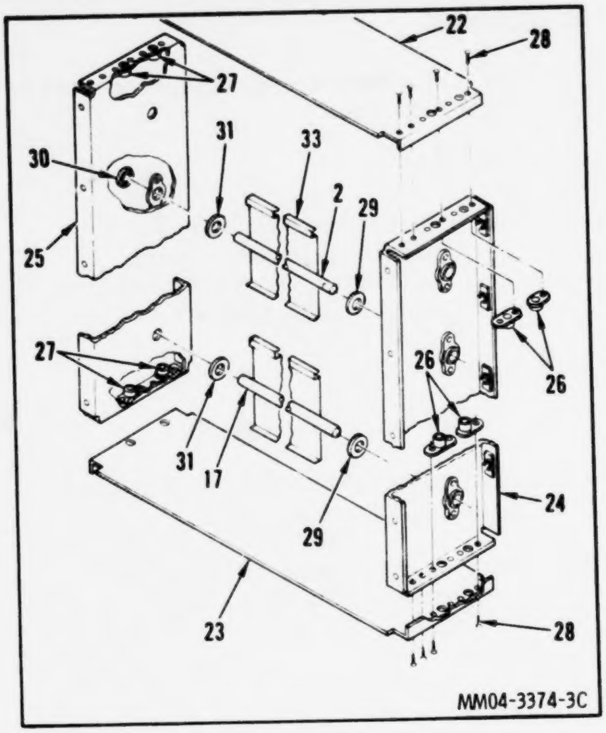
4-3-14. NO. 1 OR NO. 2 ENGINE LOUVER DISASSEMBLY/ASSEMBLY (AVIM) (cont) 4-3-14



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4. **Remove two louver endplates (22) and (23) from channels (24) and (25).**

   a. Remove four nutplates (26) from endplates (22) and (23) and channel (24) (TM 55-1500-204-25/1).

   b. Remove four nutplates (27) from endplates (22) and (23) and channel (25) (TM 55-1500-204-25/1).

   c. Remove rivets (28) from endplates (22) and (23) and channels (24) and (25) (TM 55-1500-204-25/1).

   d. Remove endplates (22) and (23) from channels (24) and (25).

5. **Remove channels (24) and (25).**

   a. Remove channel (24) from shafts (2) and (17).

   b. Remove washers (29) from shaft (2).

   c. Remove six washers (29) from shaft (17).

   d. Remove and discard seven push-on nuts (30) from louver channel (25).

   e. Remove channel (25) from vane shafts (2) and (17).

   f. Remove washer (31) from shaft (2).

   g. Remove six washers (31) from shaft (17).

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B. CLEANING

Wipe all removed and attaching parts with clean rag.

C. INSPECTION

1. **Check remote control levers, sleeve bushing, louver covers, flange bushings, vanes, assemblies, and louver linkage channel for:**

   a. Cracks. None allowed.

   b. Corrosion (para 1-5-38).

2. **Check louver channels and stripped nutplates.** None allowed.

3. **Check louver flange bushing for movement.** Bushings must move freely.

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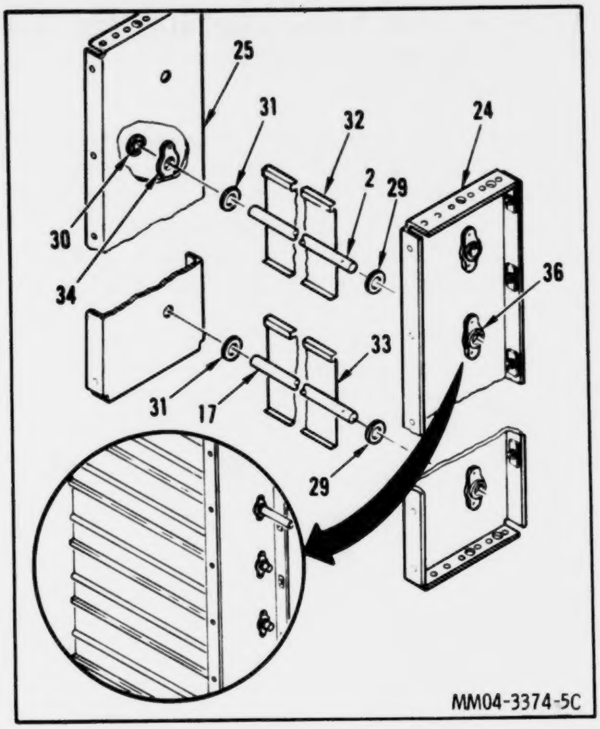

D. ASSEMBLY

1. **Install seven louver vanes (32) and (33) in louver channels (24) and (25).**

   a. Install one washer (31) on vane shaft (2).

   b. Install six washers (31) on shafts (17).

   NOTE

   Verify that the vane with longer shaft (2) is positioned in the hole second from the top of louver channels. Longer shaft will extend past channel (24).

   b. Aline and slide each vane shaft (2) and (17) through louver channel (25) and flange bearings (34).

   c. Hold vanes (32) and (33). Install seven new push-on nuts (30).

   d. Install one washer (29) on vane shaft (2) and six washers (29) on shafts (17).

   e. Aline and slide each vane shaft (2) and (17) through channel (24) and flange bearing (36).

   f. Lubricate all flange bearings (36) and (34). Use lubricant (E52).

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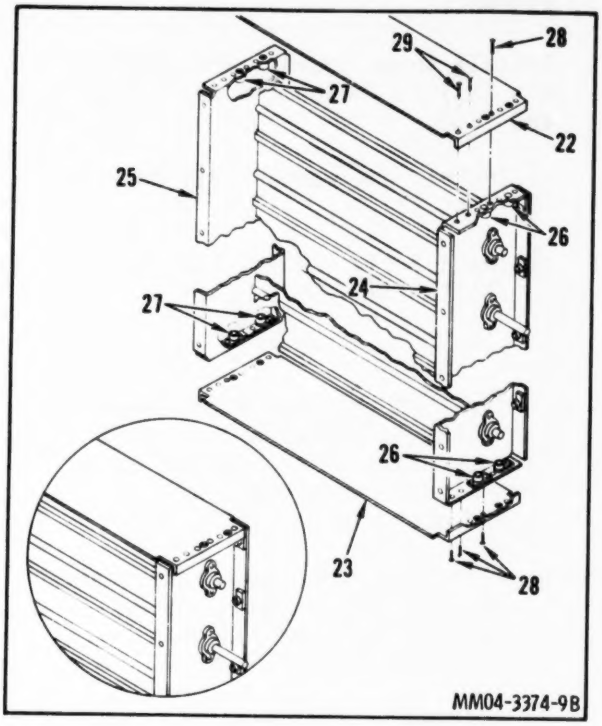
4-3-14. NO. 1 OR NO. 2 ENGINE LOUVER DISASSEMBLY/ASSEMBLY (AVIM) (cont) 4-3-14

1. **Install two louver endplates (22) and (23) on channels (24) and (25).**
   a. Aline rivet holes on endplates (22) and (23) with rivet holes on channels (24) and (25). Install rivets (28) through endplates (22) and (23) and channels (24) and (25) (TM 55-1500-204-25/1).
   b. Install four nutplates (27) on channel (25) and endplates (22) and (23) (TM 55-1500-204-25/1).
   c. Install four nutplates (26) on channel (24) and endplates (22) and (23) (TM 55-1500-204-25/1).



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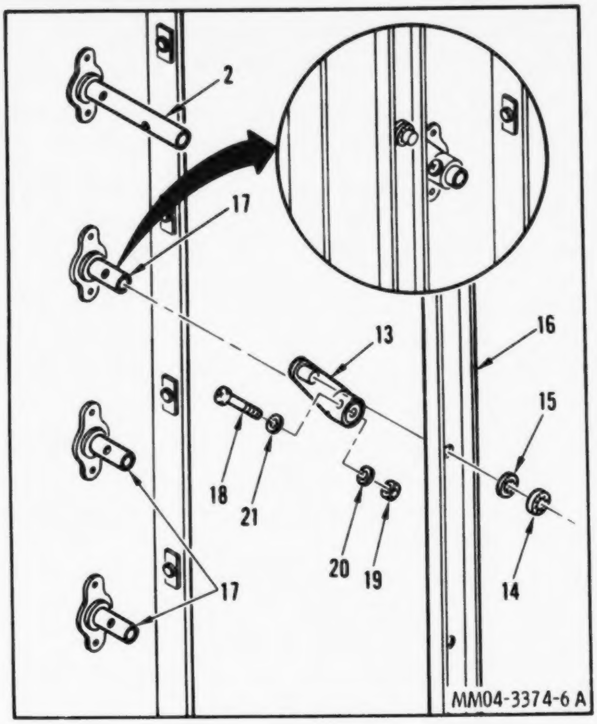
4-3-14. NO. 1 OR NO. 2 ENGINE LOUVER DISASSEMBLY/ASSEMBLY (AVIM) (cont) 4-3-14



3. Install louver linkage channel (16).

   a. Apply primer to shafts (2) and (17). Use primer (E19) (TM 55-1500-345-23).

   b. Install seven remote control levers (13) on louver vane shafts (2) and (17).

   c. Aline hole on lever (13) with hole in vane shaft (2) and (17).

   d. Install washer (21) and screw (18) through lever (3) and shaft (2) and (17).

   e. Install washer (20) and nut (19).

   f. Repeat substeps c. thru e. for other six levers (3) and shafts (2).

   g. Aline holes in channel (16) with control lever (13).

   h. Install washers (15) and new push-on nut (14) on lever (13).

   i. Repeat substep g. for other six levers (13).

NOTE

Vanes must move without binding or dragging. If binding or dragging occurs, repeat disassembly steps 3 and 4 and steps 1 and 2.

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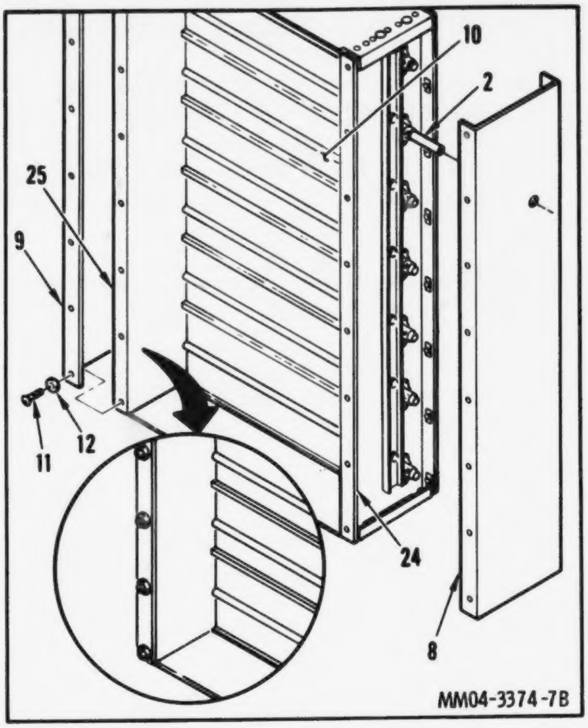
4-3-14. NO. 1 OR NO. 2 ENGINE LOUVER DISASSEMBLY/ASSEMBLY (AVIM) (cont) 4-3-14

4. **Install two louver covers (8) and (9) on louver channel (10).**
   a. Aline louver cover (8) with louver vane shaft (2).
   b. Slide cover (8) on vane shaft (2). Aline cover with nutplates on louver channel (24).
   c. Aline cover (9) with nutplates on channel (25).
   d. Install 32 washers (11) on screws (10).
   e. Install 32 washers (12) and screws (9) through louver covers (8) and (9), and channels (24) and (25).
5. **Install lever (1) on shaft (2).**
   a. Insert sleeve bushing (7) into lever (1).
   b. Install bushing (7) and lever (1) on shaft (2).
   c. Aline hole of lever (1) and hole in bushing (7) with hole in vane shaft (2).
   d. Install screw (3) with washer (6) through lever (1), bushing (7), and vane shaft (2).
   e. Install washer (5) and nut (4). Hold screw (3). Tighten nut (4).
6. **Inspect (TI).**
7. **Install engine No. 1 and No. 2 directional control shutoff valve** (para 4-3-11).
8. **Install engine louver No. 1** (para 4-3-6) **or No. 2** (para 4-3-8).
9. **Install No. 1 or No. 2 engine louver actuator** (para 4-3-2).



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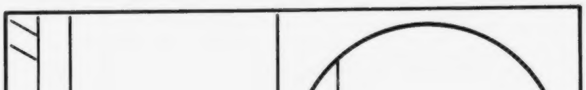

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END OF TASK

Section IV. AIR SYSTEM MAINTENANCE

4-4-1. NO. 1 OR NO. 2 ANTI-ICE VALVE AND BRACKET REMOVAL/INSTALLATION

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Crowfoot Attachment, 1-3/8, 3/8 Drive (2)	5120-00-184-8410
Crowfoot Attachment, 1-1/4, 3/8 Drive	5120-00-293-2567
Wrench, Torque, 3/8 Drive	5120-00-821-3441

Materials/Parts:

	Packing
(E16)	Petrolatum

Personnel Required:

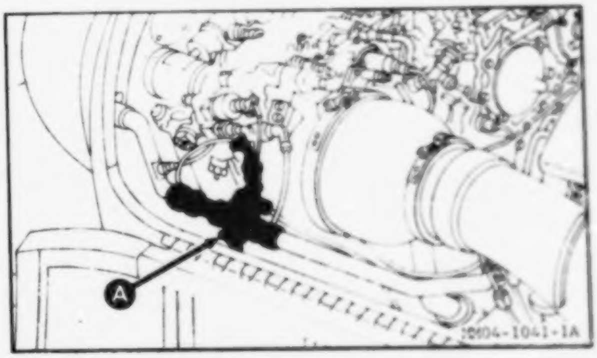
67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access door LN1 or RN1 opened



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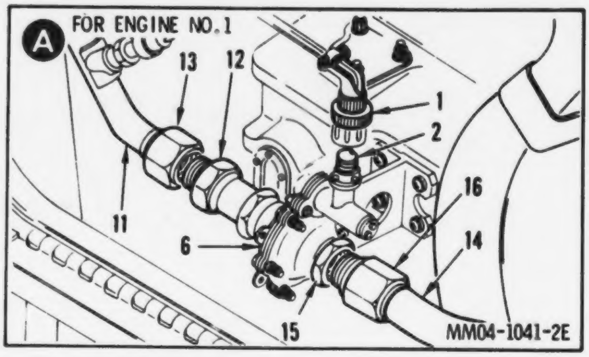
4-4-1. NO. 1 OR NO. 2 ANTI-ICE VALVE AND BRACKET REMOVAL/INSTALLATION (cont) 4-4-1

A. REMOVAL

1. Enter pilot station (para 1-7-1). Observe all safety precautions

2. Open ENG ANTI-ICE circuit breaker on pilot aft circuit breaker.

3. For engine No. 1, detach connector P33 (1) from engine inlet anti-ice valve connector L1 (2).

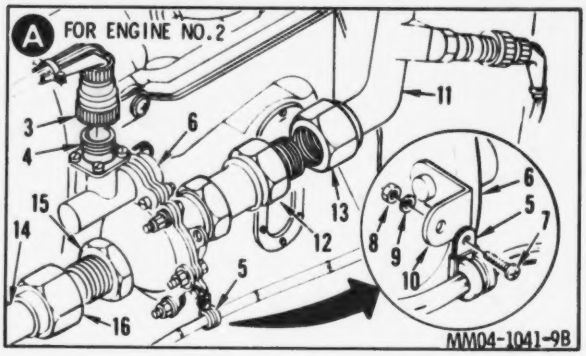

A
FOR ENGINE NO.1
13
12
1
2
16
11
6
14
15
MM04-1041-2E

4. For engine No. 2, detach connector P34 (3) from engine anti-ice valve connector L2 (4).

5. For engine No. 2, remove wire harness support clamp (5) from engine anti-ice valve (6).

   a. Hold screw (7). Remove nut (8) and washer (9).

   b. Remove screw (7) from clamp (5) and clip (10).


A
FOR ENGINE NO.2
11
3
6
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10
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16
MM04-1041-9B

6. Disconnect tube (11) from valve (6).

   a. Hold union (12). Use 1-3/8 crowfoot.

   b. Remove nut (13). Use 1-1/4 crowfoot.

7. Disconnect tube (14) from valve (6).

   a. Hold fitting (15). Use 1-3/8 crowfoot.

   b. Remove nut (16). Use 1-1/4 crowfoot.

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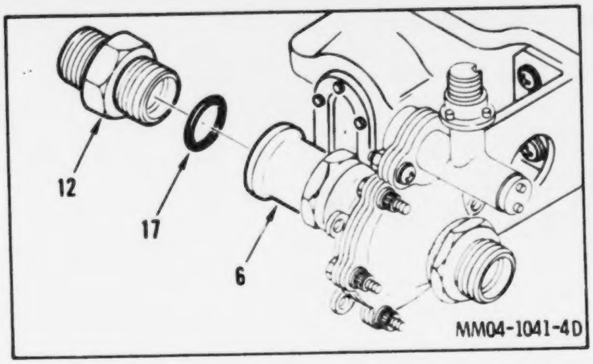
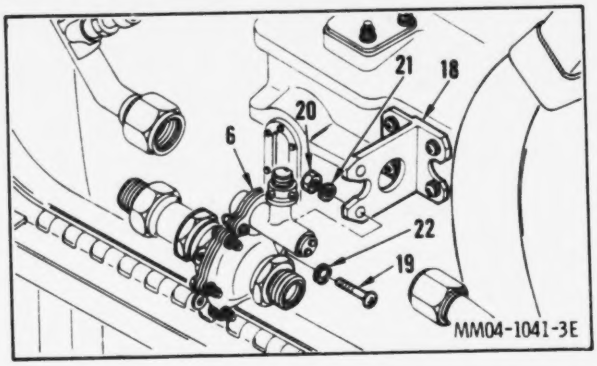
4-4-1. NO. 1 OR NO. 2 ANTI-ICE VALVE AND BRACKET REMOVAL/INSTALLATION (cont)

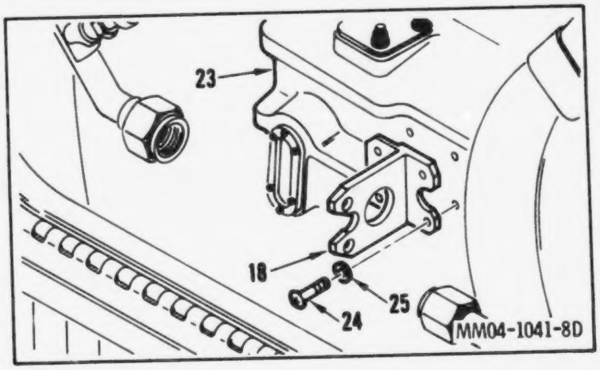
8. **Remove union (12) from valve (6).**
   a. Hold valve (6). Use 1-3/8 crowfoot.
   b. Remove union (12). Use 1-3/8 crowfoot.
   c. Remove and discard packing (17).



9. **Remove valve (6) from engine inlet anti-ice valve support (18).**
   a. Hold two screws (19).
   b. Remove two nuts (20) and washers (21).
   c. Remove two screws (19) and washers (22).



10. **Remove support (18) from engine boss (23).** Remove four screws (24) and washers (25).



B. **CLEANING**

Clean engine boss (para 1-5-36).

C. **INSPECTION**

1. **Check boss and support for cracks.** None allowed.
2. **Check boss and support for** corrosion (para 1-5-38).

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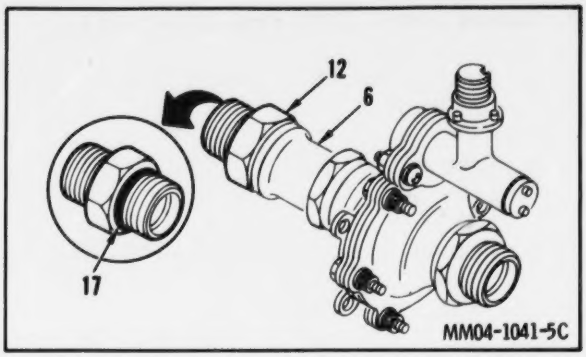
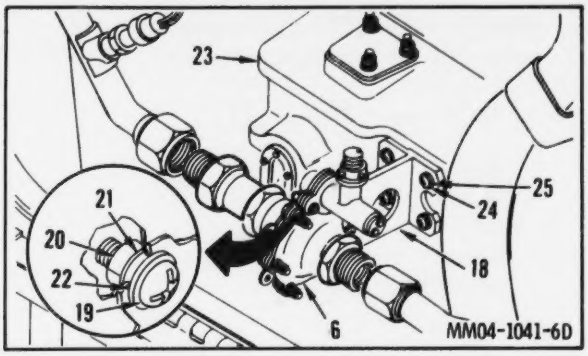
4-4-1. NO. 1 OR NO. 2 ANTI-ICE VALVE AND BRACKET REMOVAL/INSTALLATION (cont) 4-4-1

D. INSTALLATION





1. **Install new packing (17) on union (12).** Lubricate packing. Use petrolatum (E16).

2. **Install union (12) and torque to 575 INCH-POUNDS.**

   a. Lubricate threads of union (12). Use petrolatum (E16).

   b. Install union (12) in valve (6).

   c. Hold valve (6). Use 1-3/8 crowfoot.

   d. Torque union (12) to **575 INCH-POUNDS.** Use 1-3/8 crowfoot.

3. **Install support (18) on engine boss (23).**

   a. Aline support (18) on boss (23).

   b. Install four washers (25) and screws (24).

4. **Mount valve (6) on support (18).**

   a. Insert two screws (19) with washers (22) through support (18) and valve (6).

   b. Hold two screws (19).

   c. Install two washers (21) and nuts (20).

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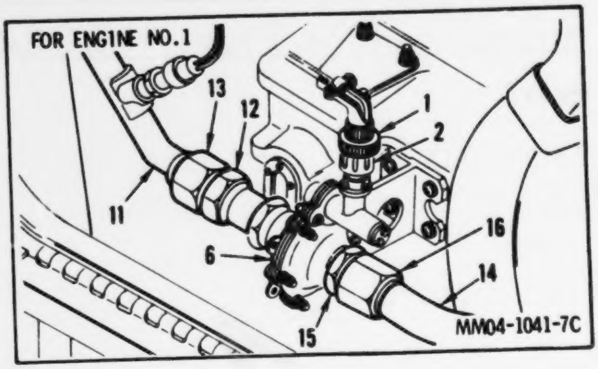
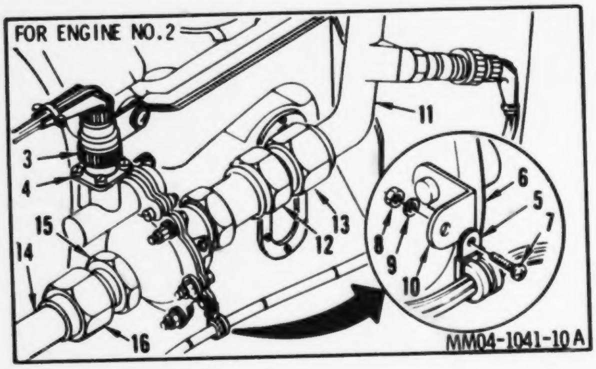
4-4-1. NO. 1 OR NO. 2 ANTI-ICE VALVE AND BRACKET REMOVAL/INSTALLATION (cont) 4-4-1



5. **Connect tube (14) to valve (6). Torque nut (16) to 440 INCH-POUNDS.**
   a. Lubricate threads of fitting (14). Use petrolatum (E17).
   b. Install nut (16) on fitting (15).
   c. Hold fitting (15). Use 1-3/8 crowfoot.
   d. Torque nut (16) to **440- INCH-POUNDS.** Use 1-1/4 crowfoot.



6. **Connect tube (11) to valve (6). Torque nut (13) to 440 INCH-POUNDS.**
   a. Lubricate threads of union (12). Use petrolatum (E16).
   b. Install nut (13) on union (12).
   c. Hold union (12). Use 1-3/8 crowfoot.
   d. Torque nut (13) to **440 INCH-POUNDS.** Use 1-1/4 crowfoot.
7. **Inspect (TI).**
8. **For engine No. 1, attach connector P33 (1) to anti-ice valve connector L1 (2).**
9. **For engine No. 2, attach connector P34 (3) to anti-ice valve connector L2 (4).**
10. **For engine No. 2, attach wire harness support clamp (5) on the engine anti-ice valve (6).** Install screw (7) through clamp (5) and clip (10). Install washer (9) and nut (8) on screw (7).
11. **Inspect (TI).**
12. **Perform engine anti-ice operational check** (TM 55-1520-238-T).
13. **Secure access door LN1 or RN 1** (para 2-2-2).

END OF TASK

4-4-2. NO. 1 OR NO. 2 ANTI-ICE THERMOSTATIC SWITCH REMOVAL/INSTALLATION 4-4-2

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Materials/Parts:

	Packing
(E16)	Petrolatum

Personnel Required:

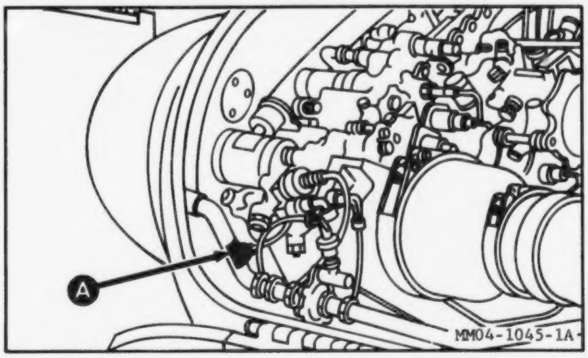
67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access door LN1 or RN1 opened



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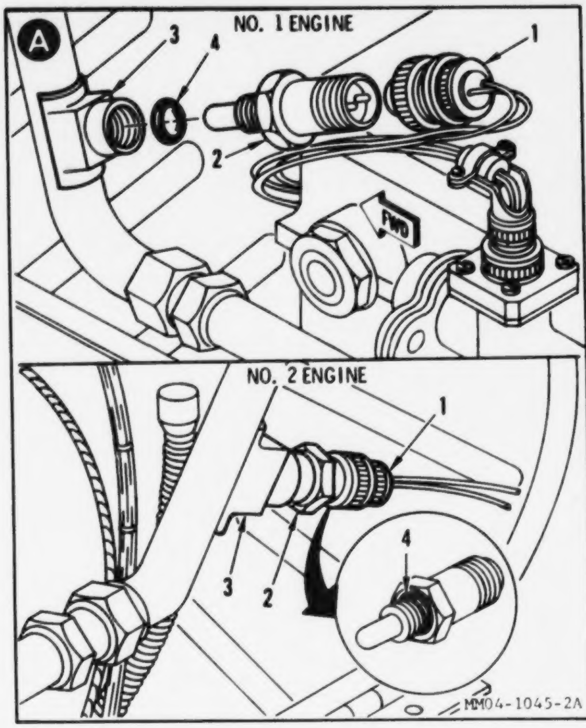
4-4-2. NO. 1 OR NO. 2 ANTI-ICE THERMOSTATIC SWITCH REMOVAL/INSTALLATION (cont) 4-4-2



A. REMOVAL

1. Detach connector P954 (1) from anti-ice temperature switch (2).
2. Remove anti-ice temperature switch (2) from anti-ice tube boss (3). Hold boss (3).
3. Remove and discard packing (4).

B. CLEANING

Clean boss (para 1-5-36).

C. INSPECTION

1. Check boss for cracks and thread damage. None allowed.
2. Check boss for corrosion (para 1-5-38).

D. INSTALLATION

1. Lubricate new packing (4). Use petrolatum (E16).
2. Install new packing (4) on anti-ice temperature switch (2).
3. Install anti-ice temperature switch (2) in boss (3). Hold boss (3). Tighten switch (2).
4. Attach connector P954 (1) to anti-ice temperature switch (2).
5. Inspect (TI).
6. Perform engine anti-ice operational check (TM 55-1520-238-T).
7. Secure access door LN1 or RN1 (para 2-2-2).

END OF TASK

4-4-3. NO. 1 OR NO. 2 ENGINE INLET COUPLING REMOVAL/INSTALLATION 4-4-3

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Personnel Required:

64R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

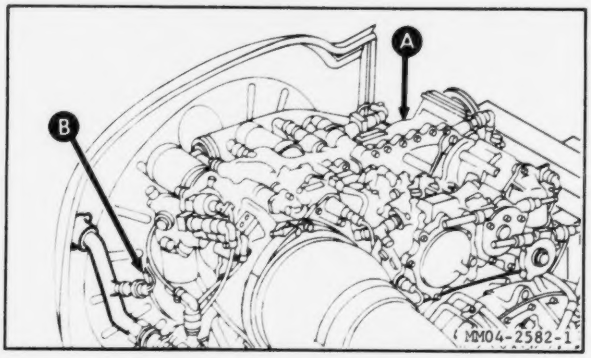
TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access door LN1 or RN1 opened

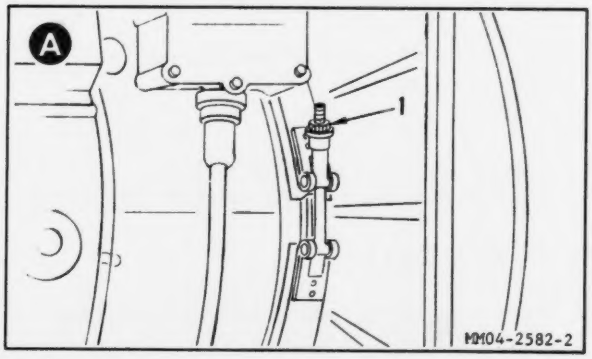
NOTE

This task is typical for No. 1 or No. 2 engine inlet coupling.



A. REMOVAL

1. Loosen inboard coupling nut (1).



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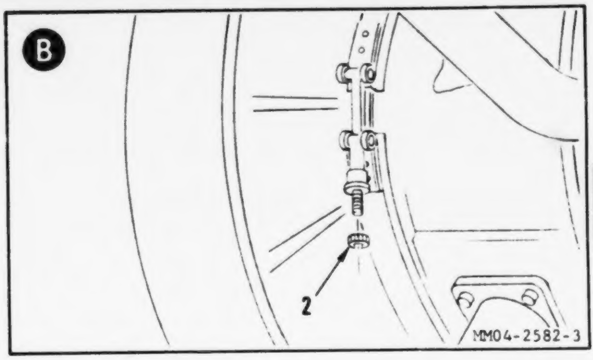
4-4-3. NO. 1 OR NO. 2 ENGINE INLET COUPLING REMOVAL/INSTALLATION (cont) 4-4-3

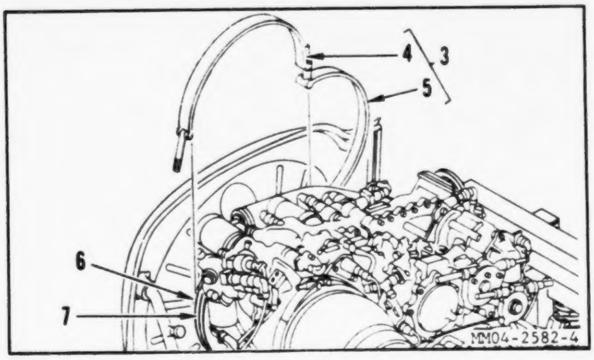
2. **Remove outboard coupling nut (2).**



3. **Remove engine inlet coupling (3).**

   a. Open outboard end of top coupling half (4).

   b. Slide up bottom coupling half (5) until clear of flanges (6) and (7).



B. **CLEANING**

Clean flanges (para 1-5-36).

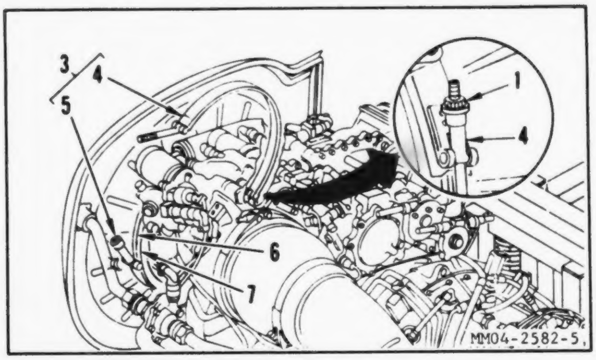
C. **INSPECTION**

1. **Check flanges for cracks.** None allowed.

2. **Check flanges for corrosion** (para 1-5-38).

D. **INSTALLATION**

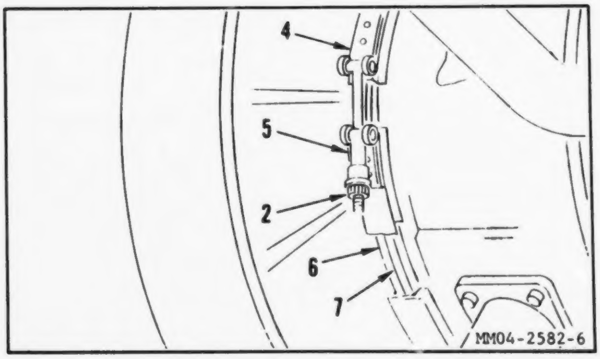
1. **Install engine inlet coupling (3).** Torque inboard coupling nut (1) and outboard coupling nut (2) **25 INCH-POUNDS.**



NOTE

Inboard nut must be loose on coupling at this point.

   a. Slide bottom coupling half (5) over flanges (6) and (7).



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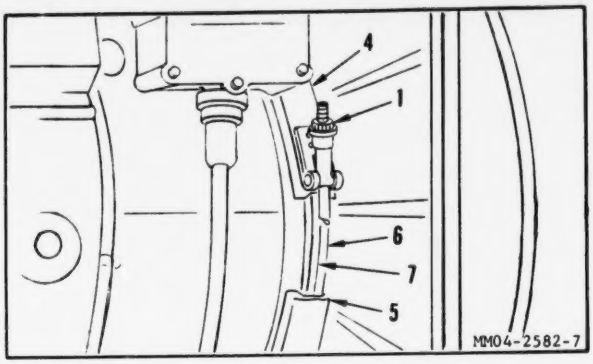
4-4-3. NO. 1 OR NO. 2 ENGINE INLET COUPLING REMOVAL/INSTALLATION (cont) 4-4-3



b. Position inboard nut (1) as shown.

c. Close outboard end of top coupling half (4).

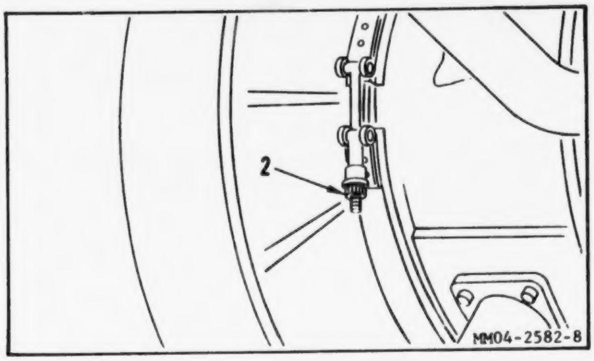
d. Aline coupling halves (4) and (5) over flanges (6) and (7).

e. Install outboard nut (2).

f. Torque nuts (1) and (2) to **25 INCH-POUNDS.**

2. **Inspect (TI).**

3. **Secure access doors LN1 or RN1** (para 2-2-2).



END OF TASK

4-4-4. NO. 1 OR NO. 2 ENGINE ANTI-ICE TUBE REMOVAL/INSTALLATION 4-4-4

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, 1-1/16 & 1-1/4 Open-end	5120-00-187-7134
Wrench, 1-3/8 & 1-7/16 Open-end	5120-00-277-2324
Crowfoot Attachment, 1-1/4, 3/8 Drive	5120-00-293-2567
Wrench, Torque, 3/8 Drive	5120-00-821-3441

Materials/Parts:

(E16) Petrolatum

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

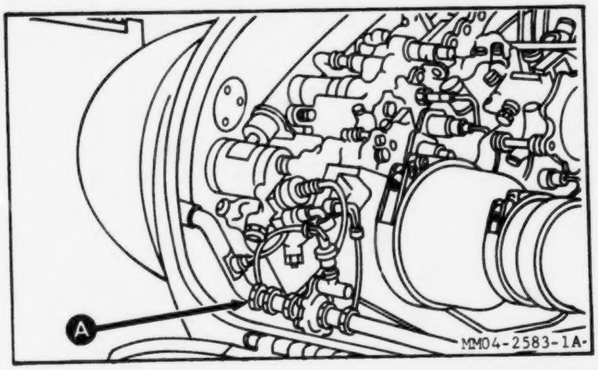
TM 55-1520-238-T

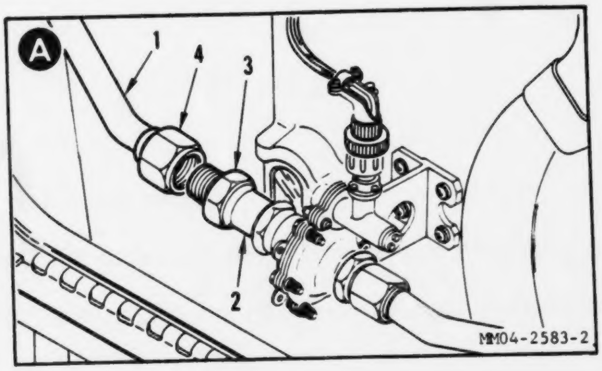
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access door LN1 or RN1 opened
4-4-2	No. 1 or No. 2 engine anti-ice themostatic switch removed

NOTE

This task is typical for No. 1 or No. 2 engine anti-ice tube.





A. REMOVAL

1. **Disconnect engine anti-ice tube (1) from valve (2).**

   a. Hold union (3). Use 1-3/8 open-end wrench.

   b. Remove nut (4). Use 1-1/4 open-end wrench.

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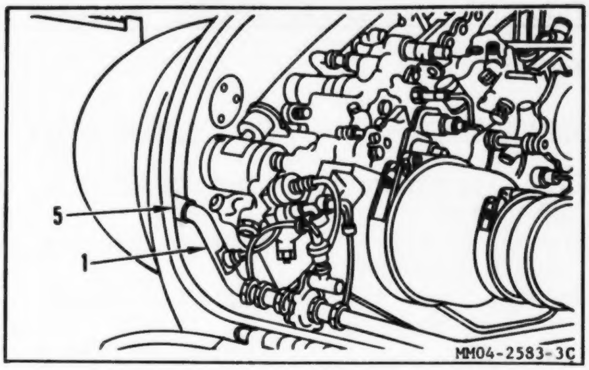
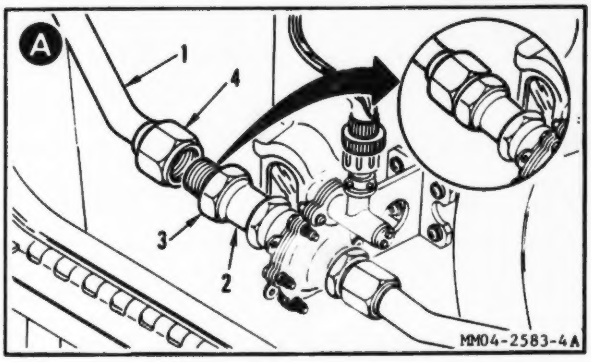
4-4-4. NO. 1 OR NO. 2 ENGINE ANTI-ICE TUBE REMOVAL/INSTALLATION (cont) 4-4-4





2. **Remove tube (1) from support (5).**

   a. Swing tube (1) and nut (4) away from valve (2).

   b. Pull tube (1) from support (5).

B. **CLEANING**

Clean outside of union and support (para 1-5-36).

C. **INSPECTION**

1. **Check union for damaged threads.** None allowed.

2. **Check support for cracks.** None allowed.

3. **Check seal for cuts, breaks, or nicks.** None allowed.

4. **Check support for corrosion** (para 1-5-38).

D. **INSTALLATION**

1. **Insert tube (1) in support (5).**

2. **Connect tube (1) to valve (2).** Torque nut (4) to **440 INCH-POUNDS.**

   a. Lubricate threads of union (3). Use petrolatum (E16).

   b. Install nut (4) on union (3).

   c. Hold union (3). Use 1-3/8 open-end wrench.

   d. Torque nut (4) to **430 INCH-POUNDS.** Use 1-1/4 crowfoot.

3. **Inspect (TI).**

4. **Install No. 1 or No. 2 engine anti-ice temperature switch** (para 4-4-2).

5. **Perform engine anti-ice operational check** (TM 55-1520-238-T).

6. **Secure access door LN1 or RN1** (para 2-2-2).

END OF TASK

4-4-5. NO. 1 ENGINE COMPRESSOR BLEED AIR TUBE REMOVAL/INSTALLATION 4-4-5

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

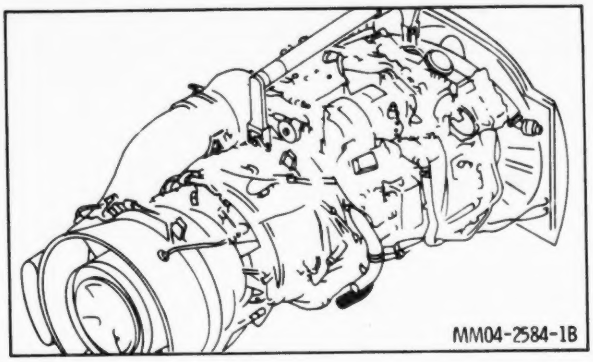
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



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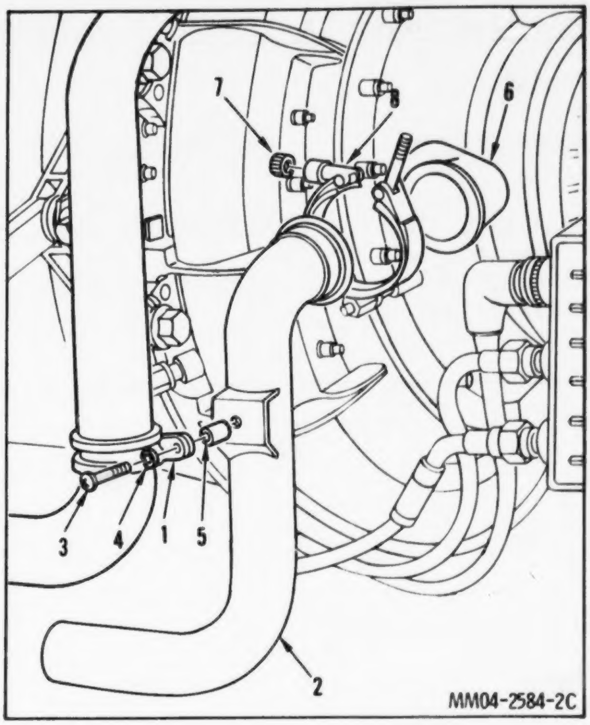
4-4-5. NO. 1 ENGINE COMPRESSOR BLEED AIR TUBE REMOVAL/INSTALLATION (cont) 4-4-5

A. REMOVAL

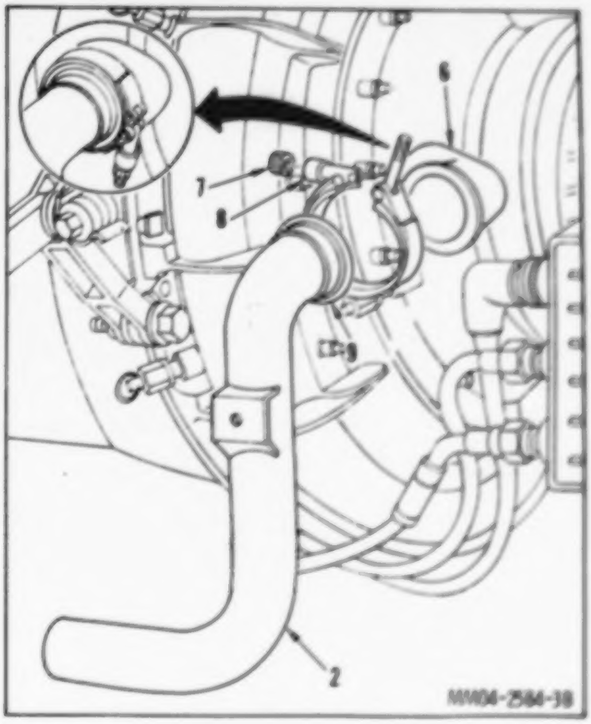
NOTE

Do not install removed engine in handling adapter.

1. **Remove No. 1 engine from nacelle** (para 4-2-3).
2. **Remove starter air tube clamp (1) from compressor bleed air tube (2).** Remove screw (3), washer (4), and spacer (5) from tube (2).
3. **Disconnect tube (2) from bleed air outlet flange (6).**
   a. Remove nut (7).
   b. Open and remove coupling (8).



4-4-5. NO. 1 ENGINE COMPRESSOR BLEED AIR TUBE REMOVAL/INSTALLATION (cont) 4-4-5



B. CLEANING

Clean flange, and coupling (para 1-5-36).

C. INSPECTION

1. **Check coupling for cracks.** None allowed.

2. **Check flange for corrosion** (para 1-5-36) **and cracks.** None allowed.

3. **Check tube for corrosion** (para 1-5-38) **and cracks.** None allowed.

4. **Check tube for discoloration around welded areas.** None allowed.

D. INSTALLATION

1. **Connect compressor tube (2) to flange (6).** Torque nut (7) to **25 INCH-POUNDS.**

   a. Slide coupling (8) on tube (2).

   b. Aline tube flange (9) on adapter flange (6).

   c. Fit coupling (8) over flanges (6) and (9) as shown.

   d. Install nut (7).

   e. Torque nut (7) to **35 INCH-POUNDS.**

2. **Install starter air tube clamp (1) on tube (2).**

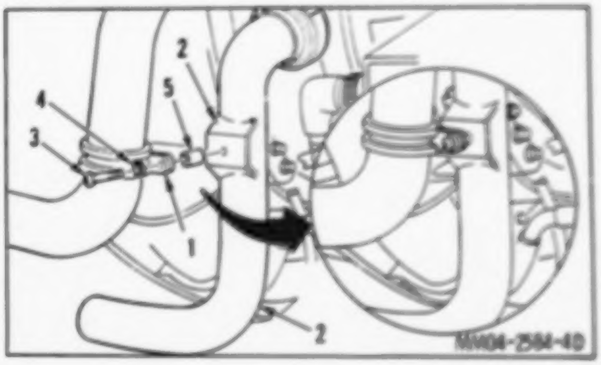
   a. Aline clamp (1) with spacer (5) on tube (2).

   b. Install screw (3) and washer (4).

3. **Inspect (TI).**

4. **Install No. 1 engine** (para 4-2-43).

END OF TASK



4-4-6. NO. 2 ENGINE COMPRESSOR BLEED AIR HOSE REMOVAL/INSTALLATION 4-4-6

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

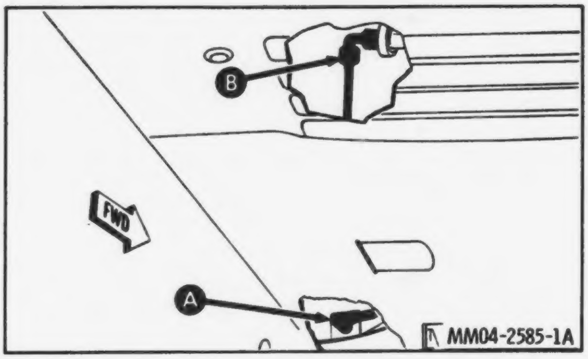
TM 55-1520-238-T

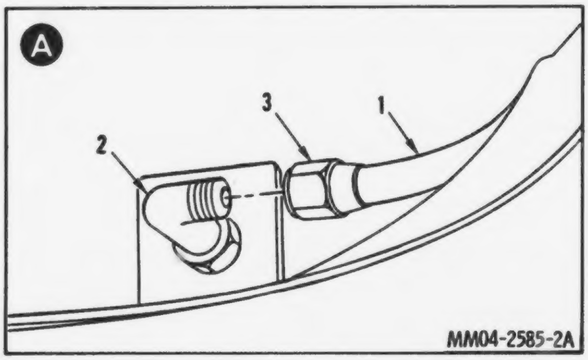
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access doors RN3 and RN4 removed

A. REMOVAL

1. **Disconnect compressor bleed air hose (1) from lower elbow (2).**
   a. Hold elbow (2).
   b. Remove nut (3).





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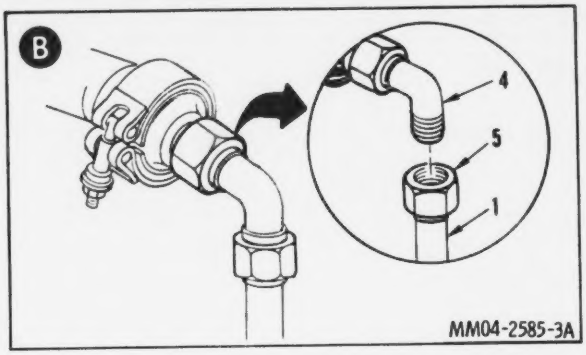
4-4-6. NO. 2 ENGINE COMPRESSOR BLEED AIR HOSE REMOVAL/INSTALLATION (cont) 4-4-6



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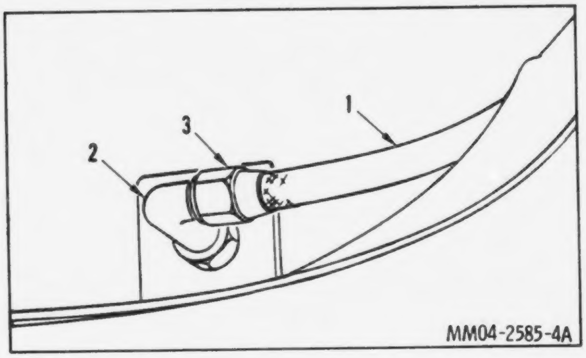


MM04-2585-4A

2. **Disconnect hose (1) from upper elbow (4).**
   - a. Hold elbow (4).
   - b. Remove nut (5).

B. CLEANING

1. **Clean threads of elbows** (para 1-5-36).

C. INSPECTION

1. **Check elbows for damaged threads.** None allowed.

D. INSTALLATION

1. **Connect hose (1) to elbow (4).**
   - a. Install nut (5) on elbow (4).
   - b. Hold elbow (4). Tighten nut (5).
2. **Connect hose (1) to lower elbow (2).**
   - a. Install nut (3) on elbow (2).
   - b. Hold elbow (2). Tighten nut (3).
3. **Inspect (TI).**
4. **Perform power plant operational check (engine 1 and engine 2)** (TM 55-1520-238-T).
5. **Secure access doors RN3 and RN4** (para 2-2-2).

END OF TASK

4-4-7. NO. 2 ENGINE COMPRESSOR BLEED AIR ADAPTER AND ELBOW REMOVAL/INSTALLATION 4-4-7

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Materials/Parts:

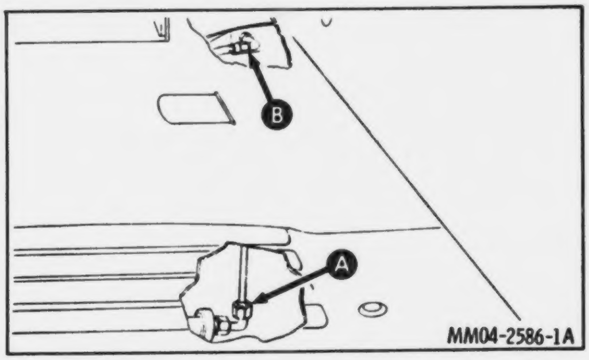
	Adapter Elbow Packing
(E16)	Petrolatum

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-2-8	No. 2 engine removed



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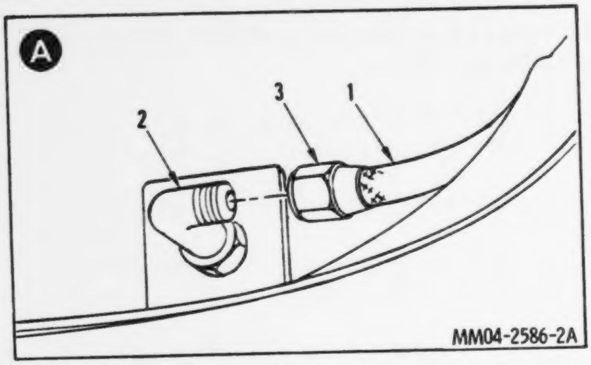
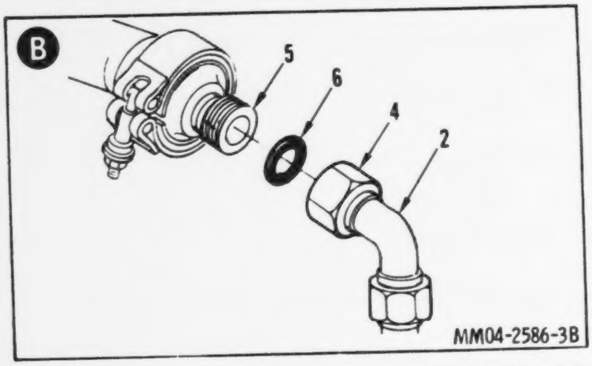
4-4-7. NO. 2 ENGINE COMPRESSOR BLEED AIR ADAPTER AND ELBOW REMOVAL/INSTALLATION (cont)



MM04-2586-2A



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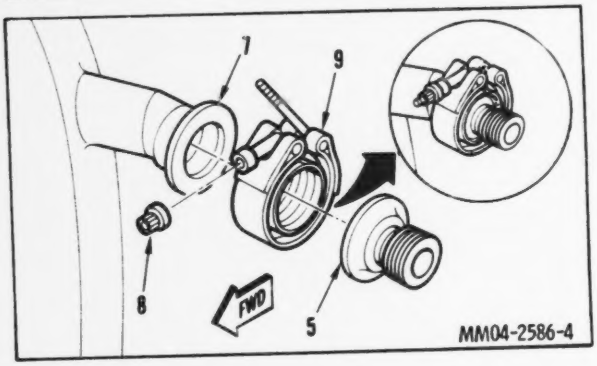

MM04-2586-4

A. REMOVAL

NOTE

Do not install removed engine on handling adapter.

1. **Remove No. 2 engine from nacelle** (para 4-2-11).
2. **Disconnect hose (1) from compressor bleed air adapter elbow (2).**
   a. Hold elbow (2).
   b. Remove nut (3).
3. **Remove elbow (2) and nut (4) from compressor bleed air adapter (5).**
   a. Hold elbow (2). Loosen nut (4).
   b. Remove elbow (2).
   c. Remove and discard packing (6).
4. **Remove adapter (5) from bleed air outlet flange (7).**
   a. Remove coupling nut (8).
   b. Open and remove coupling (9).

B. CLEANING

Clean flange and coupling (para 1-5-36).

C. INSPECTION

1. **Check coupling for cracks.**
2. **Check flange for corrosion** (para 1-5-38).

D. INSTALLATION

1. **Install adapter (5) on bleed air outlet flange (7).** Torque coupling nut (8) to **25 INCH-POUNDS.**
   a. Aline adapter (5) and flange (7).
   b. Fit coupling (9) over adapter (5) and flange (7) as shown.
   c. Install nut (8).
   d. Torque nut (8) to **25 INCH-POUNDS.**

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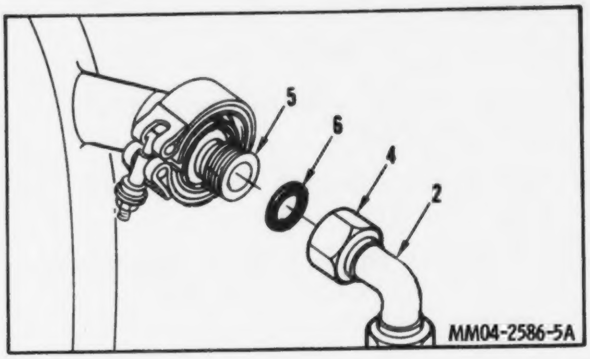
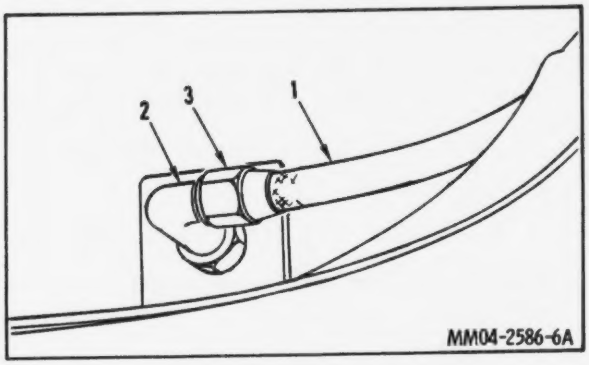
4-4-7. NO. 2 ENGINE COMPRESSOR BLEED AIR ADAPTER AND ELBOW REMOVAL/INSTALLATION (cont)



MM04-2586-5A

2. **Install elbow (2) and nut (4) on adapter (5).**
   a. Lubricate new packing (6). Use petrolatum (E16).
   b. Install packing (6) on elbow (2).
   c. Install elbow (2) in adapter (5) aline elbow as shown.
   d. Hold elbow (2). Tighten nut (4).
3. **Connect hose (1) to elbow (2).**
   a. Install nut (3) on elbow (2).
   b. Hold elbow (2). Tighten nut (3).
4. **Inspect (TI).**
5. **Install No. 2 engine** (para 4-2-47).



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END OF TASK

4-4-8. NO. 1 OR NO. 2 ENGINE ANTI-ICE SUPPORT REMOVAL/INSTALLATION 4-4-8

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access door LN1 or RN1 opened
4-4-2	No. 1 or No. 2 engine anti-ice thermostatic switch removed
4-4-4	No. 1 or No. 2 engine anti-ice tube removed

NOTE

This task is typical for No. 1 or No. 2 engine anti-ice support.

A. REMOVAL

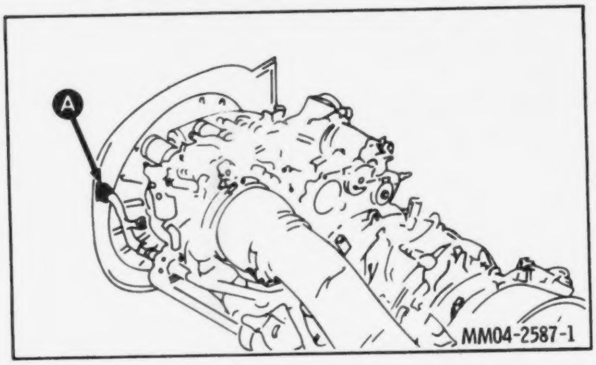
1. **Remove three screws (1).**
2. **Remove engine anti-ice tube support (2) from air inlet (3).**
3. **Remove and discard gasket (4) and seal (5).**

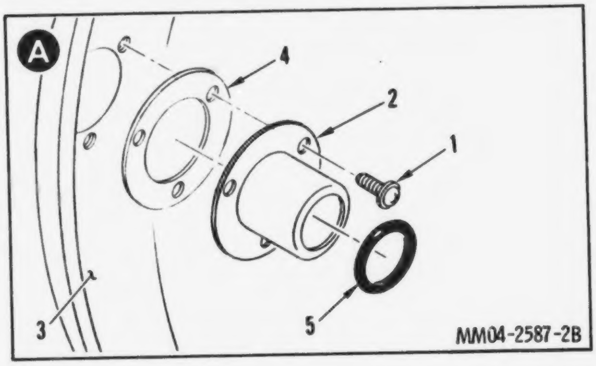
B. CLEANING

Clean support mounting area on inlet (para 1-5-36).

C. INSPECTION

Check air inlet for cracks. None allowed.





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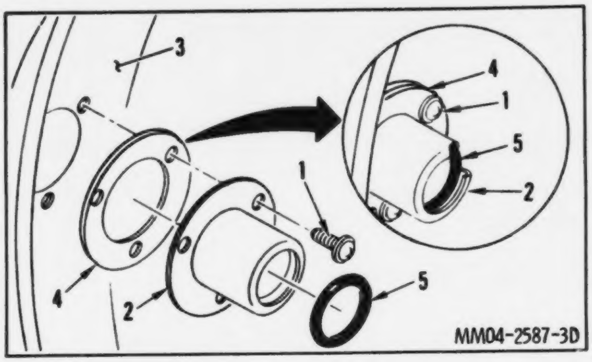
4-4-8. NO. 1 AND NO. 2 ENGINE ANTI-ICE SUPPORT REMOVAL/INSTALLATION (cont) 4-4-8



D. INSTALLATION

1. Install seal (5) in support (2).
2. Aline new gasket (4) and support (2) on air inlet (3).
3. Install three screws (1).
4. Inspect (TI).
5. Install No. 1 or No. 2 engine anti-ice tube (para 4-4-4).
6. Install No. 1 or No. 2 engine anti-ice temperature switch (para 4-4-2).
7. Secure access door LN1 or RN1 (para 2-2-2).

END OF TASK

4-4-9. NO. 1 AND NO. 2 ENGINE ANTI-ICE SUPPLY TUBE REMOVAL/INSTALLATION 4-4-9

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, 1-1/16 & 1-1/4 Open-end	5120-00-187-7134
Wrench, 1-3/8 & 1-7/16 Open-end	5120-00-277-2324
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Materials/Parts:

(E16) Petrolatum

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

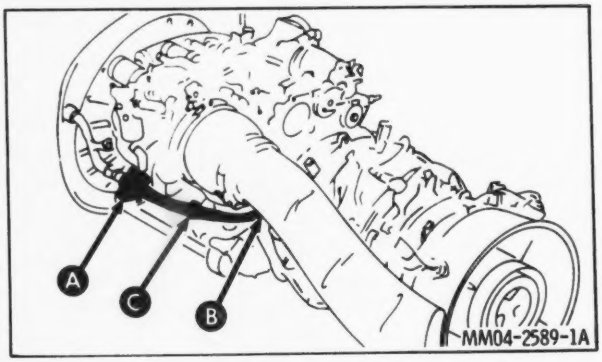
TM 55-1520-238-T

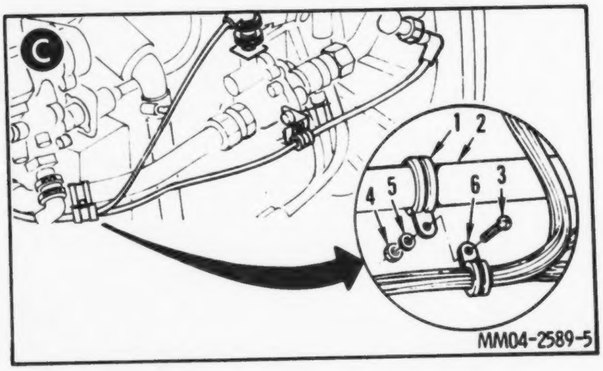
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access door LN1 or RN1 opened

NOTE

This task is typical for No. 1 or No. 2 engine anti-ice supply tube.





A. REMOVAL

1. **For engine No. 2, remove wire harness support clamp (1) from anti-ice supply tube (2).**
   a. Hold screw (3). Remove nut (4) and washer (5).
   b. Remove screw (3) from clamps (1) and (6).

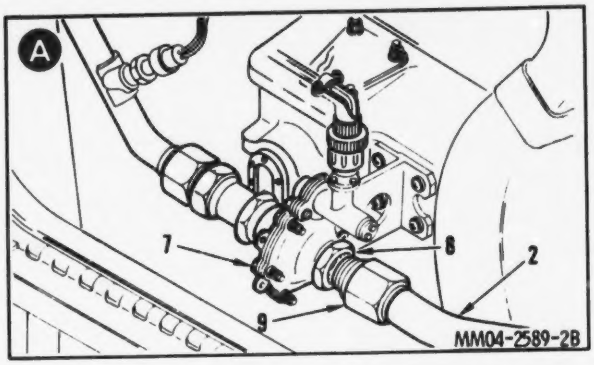
GO TO NEXT PAGE

4-4-9. NO. 1 AND NO. 2 ENGINE ANTI-ICE SUPPLY TUBE REMOVAL/INSTALLATION (cont)

2. **Disconnect tube (2) from valve (7).**

   a. Hold fitting (8). Use 1-3/8 open-end wrench.

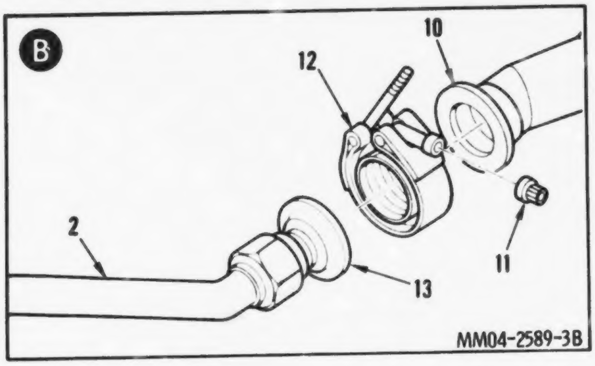
   b. Remove nut (9). Use 1-1/4 open-end wrench.



3. **Disconnect tube (2) from adapter flange (10).**

   a. Remove nut (11).

   b. Open and remove coupling (12).



B. CLEANING

Clean fitting, flange, and coupling (para 1-5-36).

C. INSPECTION

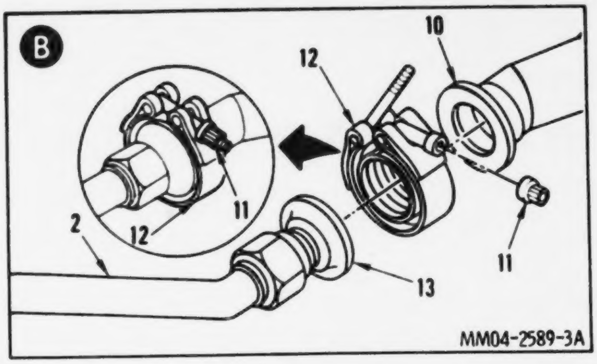
1. **Check fitting for damaged threads.** None allowed.
2. **Check coupling, flange, and tube for cracks.** None allowed.
3. **Check flange and tube for corrosion** (para 1-5-38).

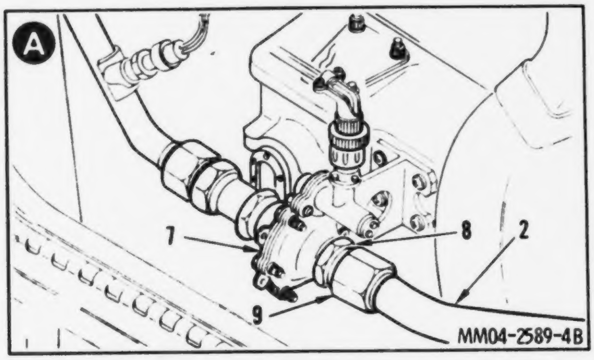
GO TO NEXT PAGE

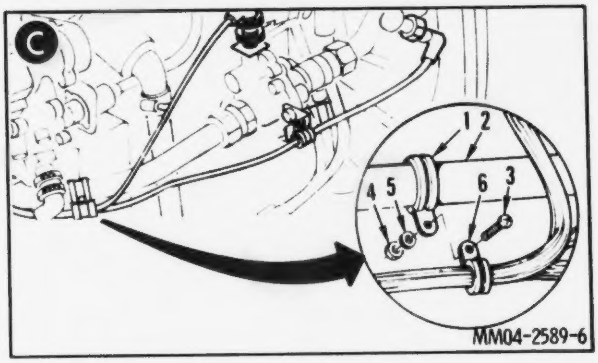
4-4-9. NO. 1 AND NO. 2 ENGINE ANTI-ICE SUPPLY TUBE REMOVAL/INSTALLATION (cont) 4-4-9

D. INSTALLATION

1. **Connect tube (2) to flange (10). Torque nut (11) to 25 INCH-POUNDS.**
   - a. Slide coupling (12) on tube (2).
   - b. Aline tube flange (13) on adapter flange (10).
   - c. Fit coupling (12) over flanges (10) and (13).
   - d. Install nut (11).
   - e. Aline nut (9) on fitting (8).
   - f. Torque nut (11) to 25 INCH-POUNDS. Use 1/4 drive torque wrench.
2. **Connect tube (2) to valve (7).**
   - a. Lubricate threads of fitting (8). Use petrolatum (E16).
   - b. Install nut (9) on fitting (8).
   - c. Hold fitting (8). Tighten nut (9).
3. **For engine No. 2, install wire harness support clamps (1) and (6) on anti-ice supply tube (2).**
   - a. Insert screw (3) through clamps (1) and (6).
   - b. Install washer (5) and nut (4).
4. **Inspect (TI).**
5. **Perform engine anti-ice operational check** (TM 55-1520-238-T).
6. **Secure access door LN1 or RN1** (para 2-2-2).







END OF TASK

4-4-10. NO. 1 ENGINE AIR DUCT REMOVAL 4-4-10

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

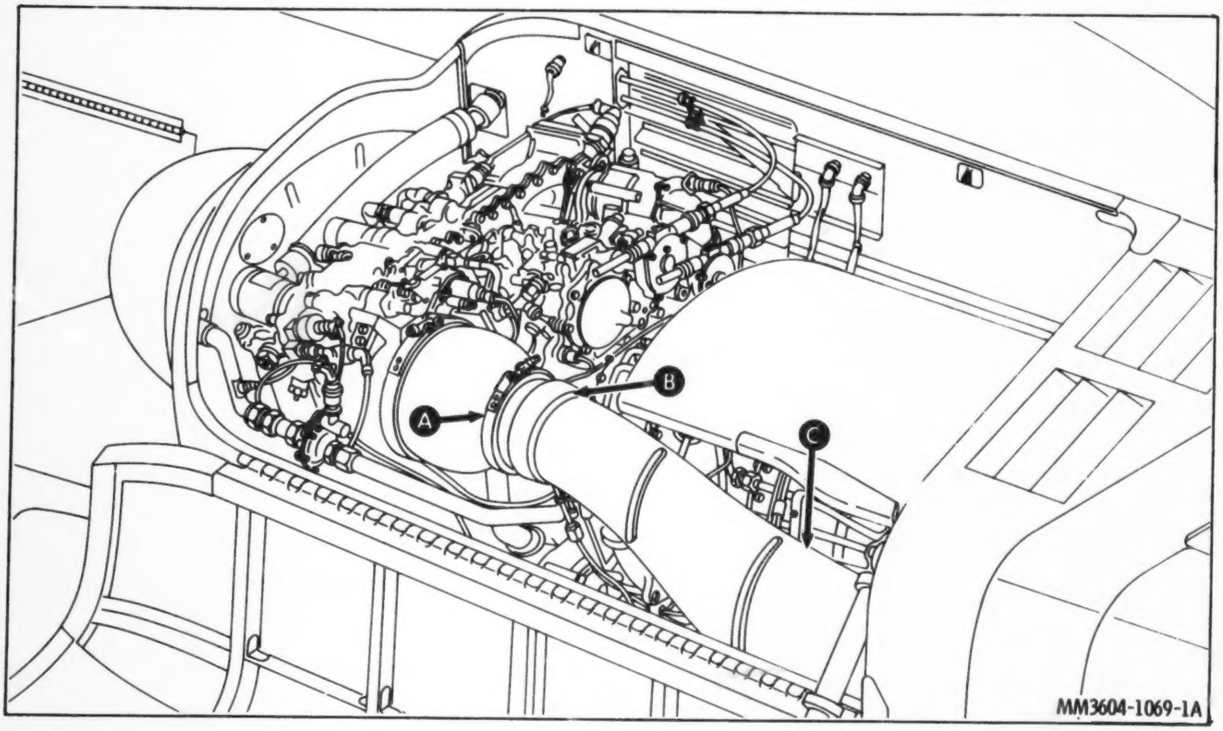
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door LN1 opened

Personnel Required:

67R10 Attack Helicopter Repairer



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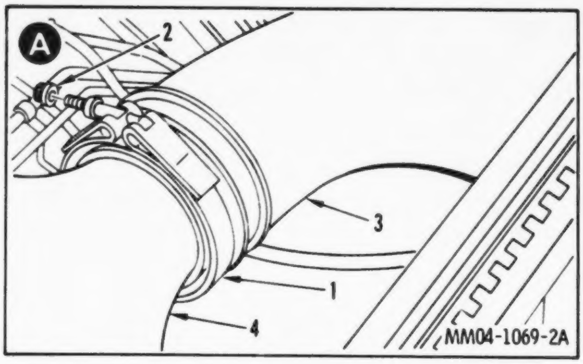
4-4-10. NO. 1 ENGINE AIR DUCT REMOVAL (cont) 4-4-10

A. REMOVAL

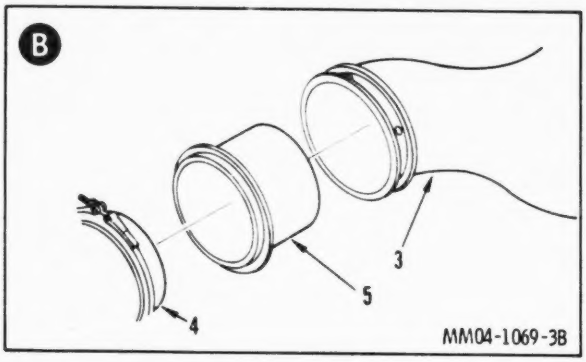
1. **Remove air duct coupling (1).**

   a. Remove nut (2).

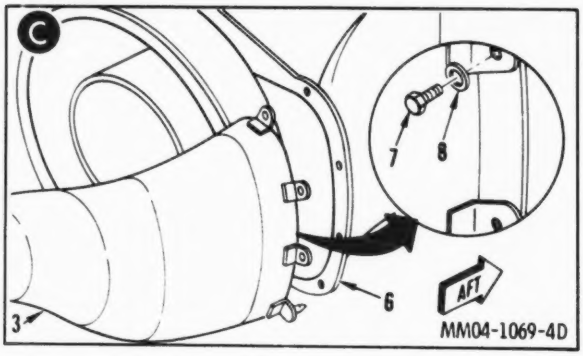
   b. Open and remove coupling (1) from air duct (3) and particle separator blower (4).



2. **Remove air duct (3) from particle separator blower (4).** Slide adapter (5) aft. Remove air duct (3).



3. **Disconnect air duct (3) from primary nozzle (6).** Remove three bolts (7) and washers (8).



B. CLEANING

Wipe all removed and attaching parts with a clean rag.

C. INSPECTION

Check air duct, blower, adapter, and nozzle for:

a. Cracks. None allowed.

b. Corrosion (para 1-5-38).

END OF TASK

4-4-11. NO. 1 ENGINE AIR DUCT INSTALLATION 4-4-11

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Personnel Required:

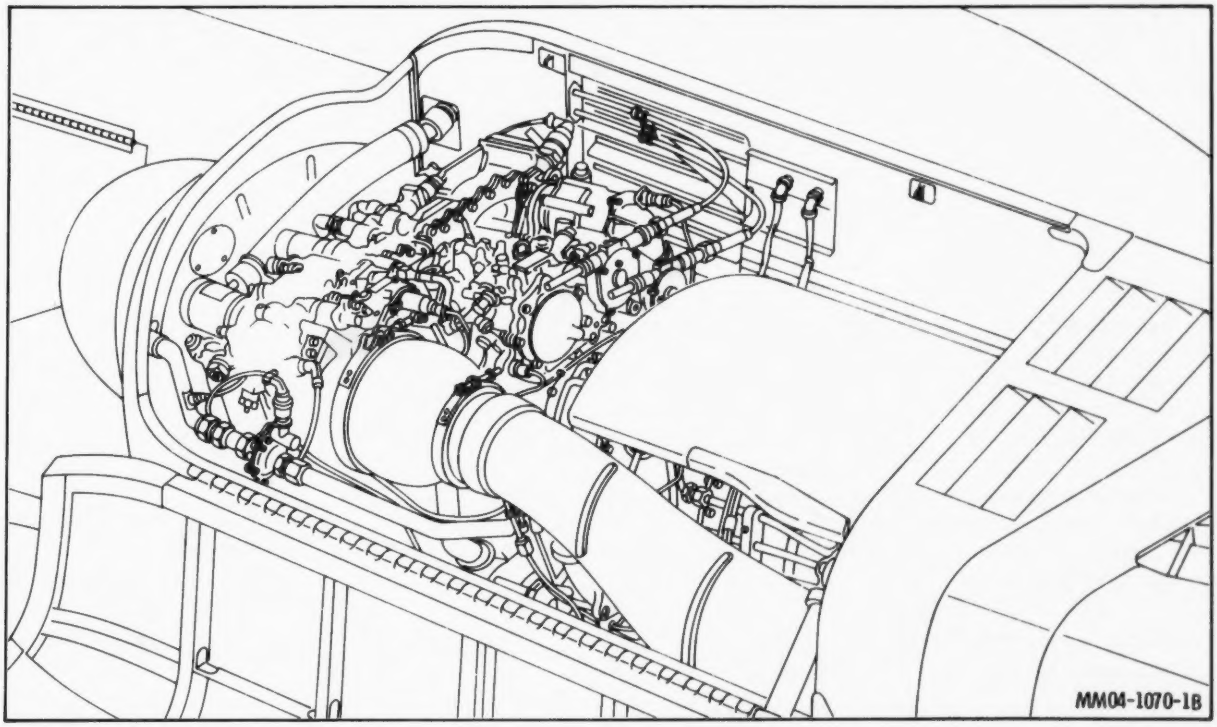
67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



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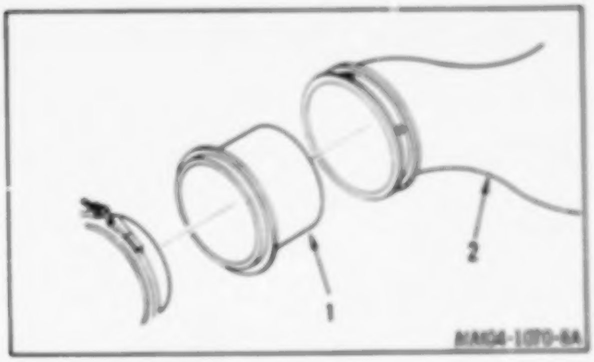
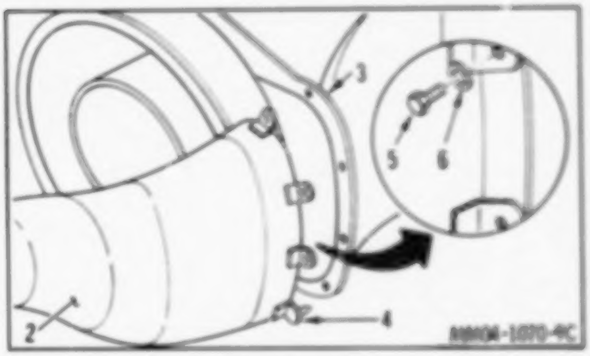
4-4-11. NO. 1 ENGINE AIR DUCT INSTALLATION (cont) 4-4-11

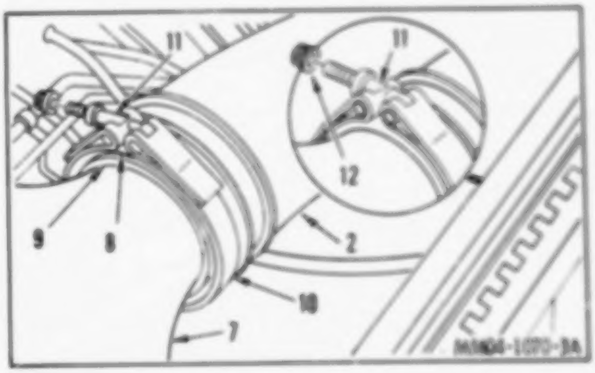
1. **Install adapter (1) in air duct (2).**



2. **Install duct (2) on primary nozzle (3).**
   a. Aline pin (4) at bottom of duct (2) with primary nozzle (3).
   b. Install three washers (6) and bolts (5).



3. **Install duct (2) on particle separator blower (7).**
   a. Position air duct flange (8) on blower flange (9).
   b. Position coupling (10) around flanges (8) and (9) with bolt (11) at top facing inboard.
   c. Install coupling nut (12) on bolt (11).
   d. Torque nut (12) to **25 INCH-POUNDS.**



4. **Inspect (TI).**
5. **Perform power plant operational check (engine 1)** (TM 55-1520-238-T).
6. **Secure engine work platform door LN1** (para 2-2-2).

END OF TASK

4-4-12. NO. 2 ENGINE AIR DUCT REMOVAL 4-4-12

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

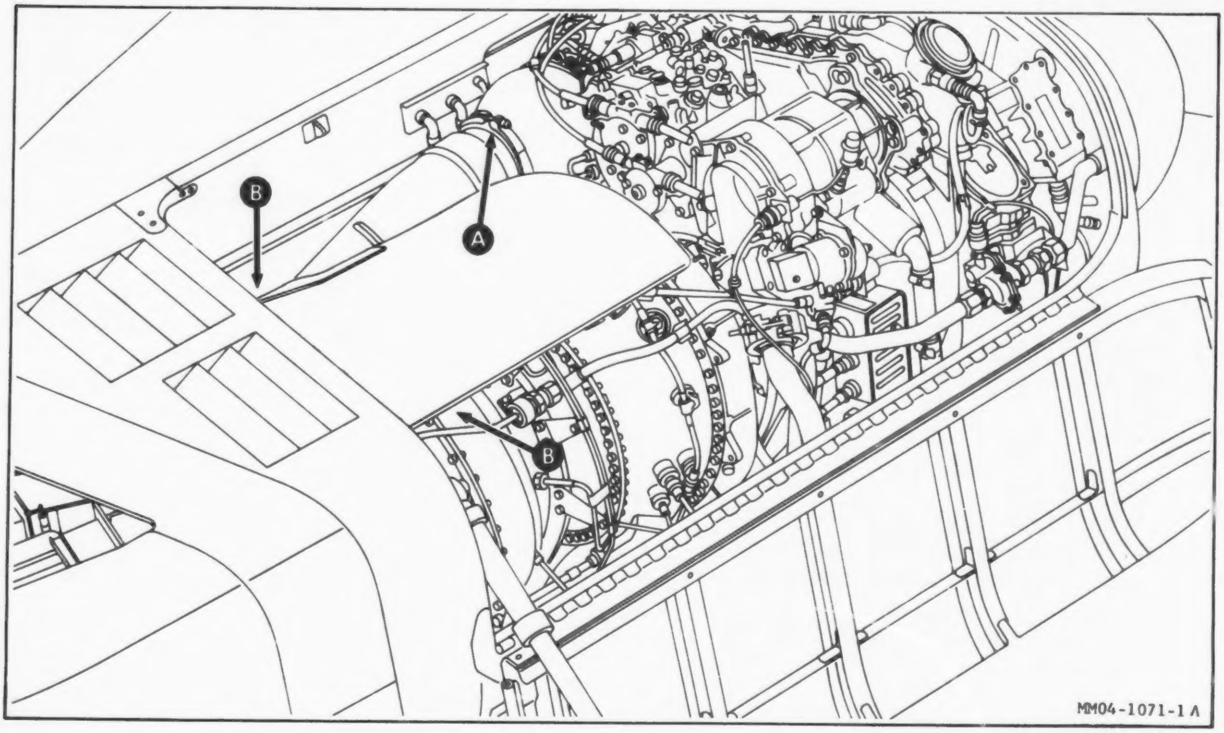
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R10 Attack Helicopter Repairer

Equipment Conditions

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door RN1 opened



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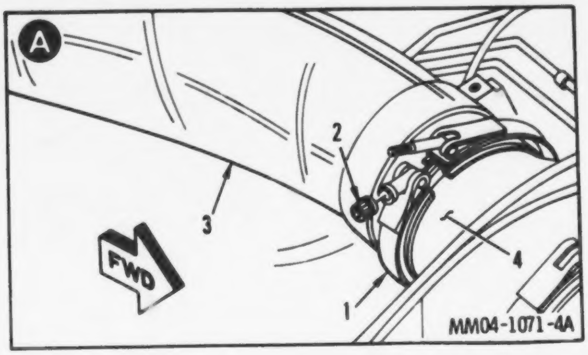
4-4-12. NO. 2 ENGINE AIR DUCT REMOVAL (cont) 4-4-12

A. REMOVAL

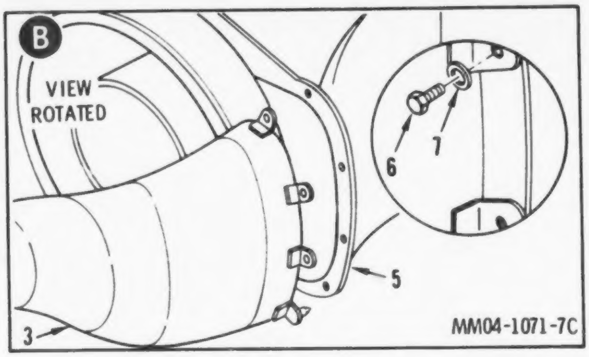
1. **Remove air duct coupling (1).**

   a. Remove nut (2).

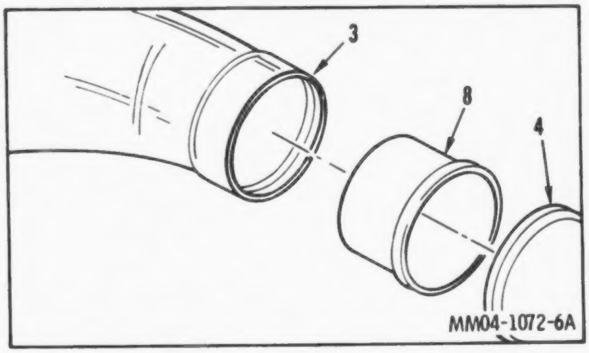
   b. Open and remove coupling (1) from air duct (3) and particle separator blower (4).


A
2
3
FWD
4
1
MM04-1071-4A

2. **Disconnect air duct (3) from primary nozzle (5).** Remove three bolts (6) and washers (7).


B
VIEW ROTATED
6
7
5
3
MM04-1071-7C

3. **Remove duct (3) from blower (4).** Slide adapter (8) aft. Remove duct (3).


3
8
4
MM04-1072-6A

B. CLEANING

Wipe all removed and attaching parts with a clean rag.

C. INSPECTION

Check air duct, blower, adapter, and nozzle for:

a. Cracks. None allowed.

b. Corrosion (para 1-5-38).

END OF TASK

4-4-13. NO. 2 ENGINE AIR DUCT INSTALLATION 4-4-13

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Personnel Required:

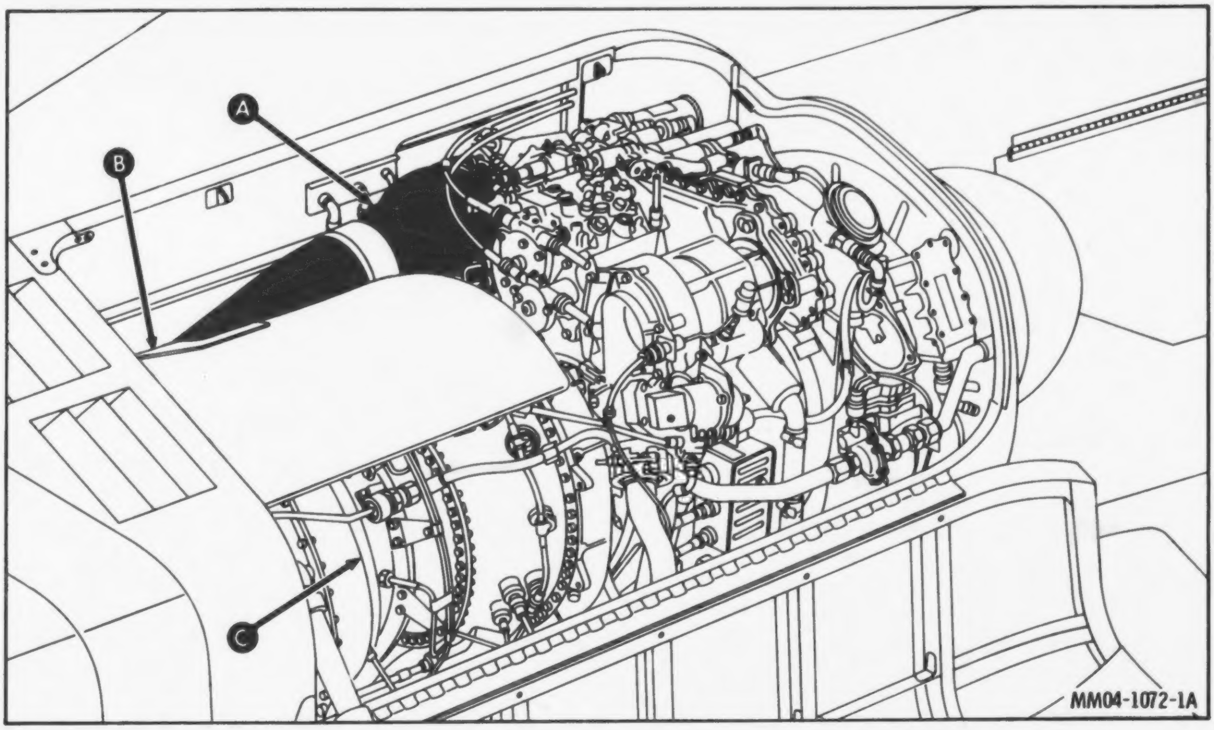
67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door RN1 opened



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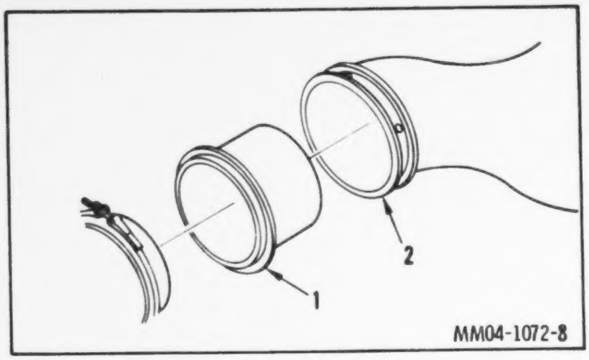
4-4-13. NO. 2 ENGINE AIR DUCT INSTALLATION (cont) 4-4-13

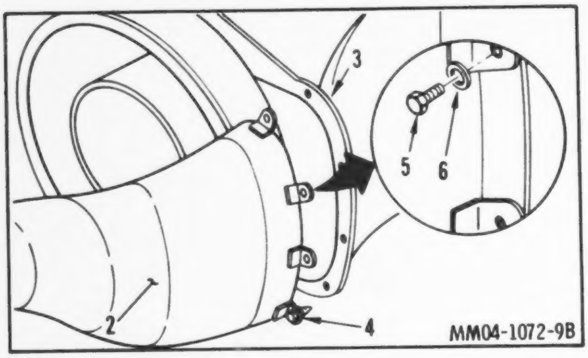
1. Install adapter (1) in air duct (2).



2. Install air duct (2) on primary nozzle (3).

   a. Aline pin (4) at bottom of duct (2) to nozzle (3).

   b. Install three bolts (5) and washers (6).

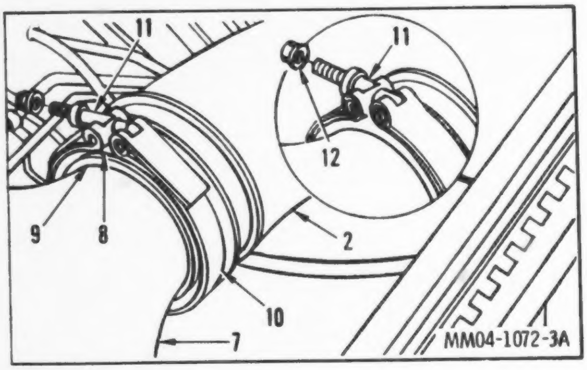


3. Install air duct (2) on particle separator blower (7).

   a. Position air duct flange (8) on blower flange (9).

   b. Position coupling (10) around flanges (8) and (9) with bolt (11) at top and facing inboard.

   c. Install coupling nut (12) on bolt (11).



4. Torque coupling nut (12) to 25 INCH-POUNDS.

5. Inspect (TI).

6. Perform power plants operational check (engine 2) (TM 55-1520-238-T).

7. Secure engine work platform door RN1 (para 2-2-2).

END OF TASK

4-4-14. NO. 1 ENGINE REGULATING VALVE REMOVAL 4-4-14

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

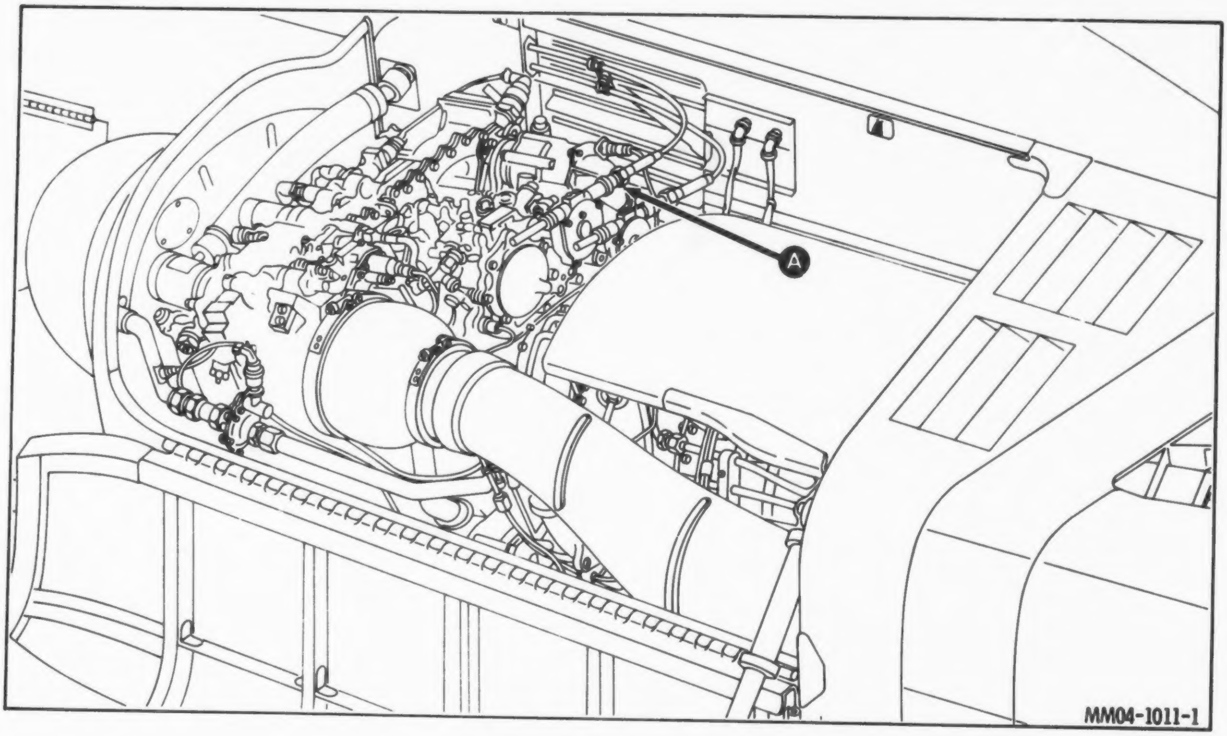
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door LN1 opened

Personnel Required:

67R10 Attack Helicopter Repairer



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4-4-14. NO. 1 ENGINE REGULATING VALVE REMOVAL (cont) 4-4-14

A. REMOVAL

1. **Enter pilot station (para 1-7-1). Observe all safety precautions.**

2. **Open ENG START circuit breaker on pilot forward circuit breaker panel.**

3. **Detach connector P39 (1) from starter regulator connector L3 (2).** Remove lockwire.

4. **Remove wire harness support clamps (3) and (4) from engine regulating valve tube (5).**

   a. Hold screw (6). Remove nut (7) and washer (8).

   b. Remove screw (6) from clamps (7) and (8).

5. **Remove lower coupling (9) from regulator valve (10) and starter air tube (11).** Remove nut (12).

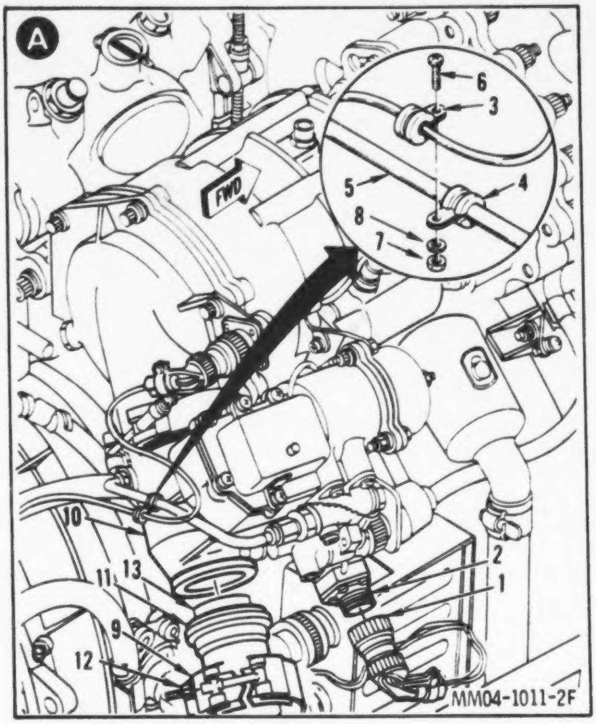
6. **Remove insert (13) from tube (11).**

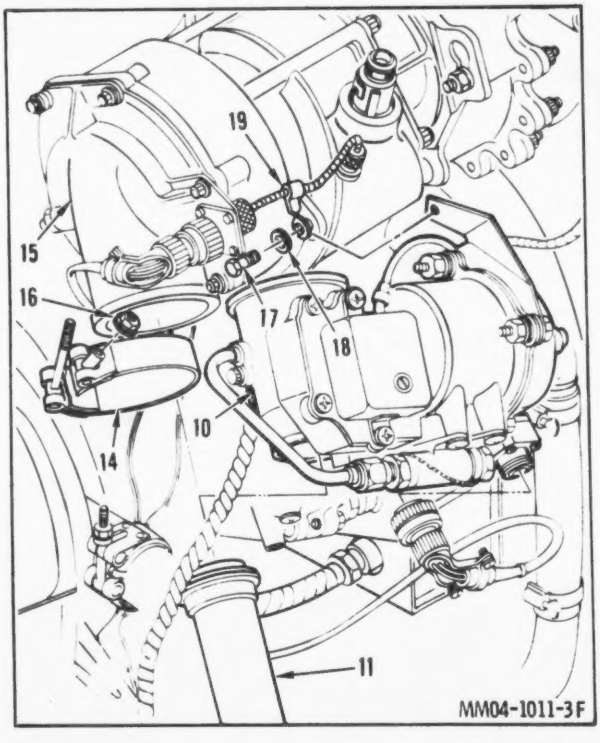
7. **Remove coupling (14) from valve (10) and starter (15).** Remove nut (16).

8. **Remove valve (10) from starter (15).**

   a. Remove bolt (17) and washer (18) from clamp (19) and starter (15).

   b. Slide valve (10) clear of starter (15) and tube (11).





B. CLEANING

Wipe all removed and attaching parts with a clean rag.

C. INSPECTION

1. **Check regulating valve for cracks.** None allowed.

2. **Check regulating valve for corrosion** (para 1-5-38).

END OF TASK

4-4-15. NO. 1 ENGINE REGULATING VALVE INSTALLATION 4-4-15

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Materials/Parts:

(E34) Lockwire

References:

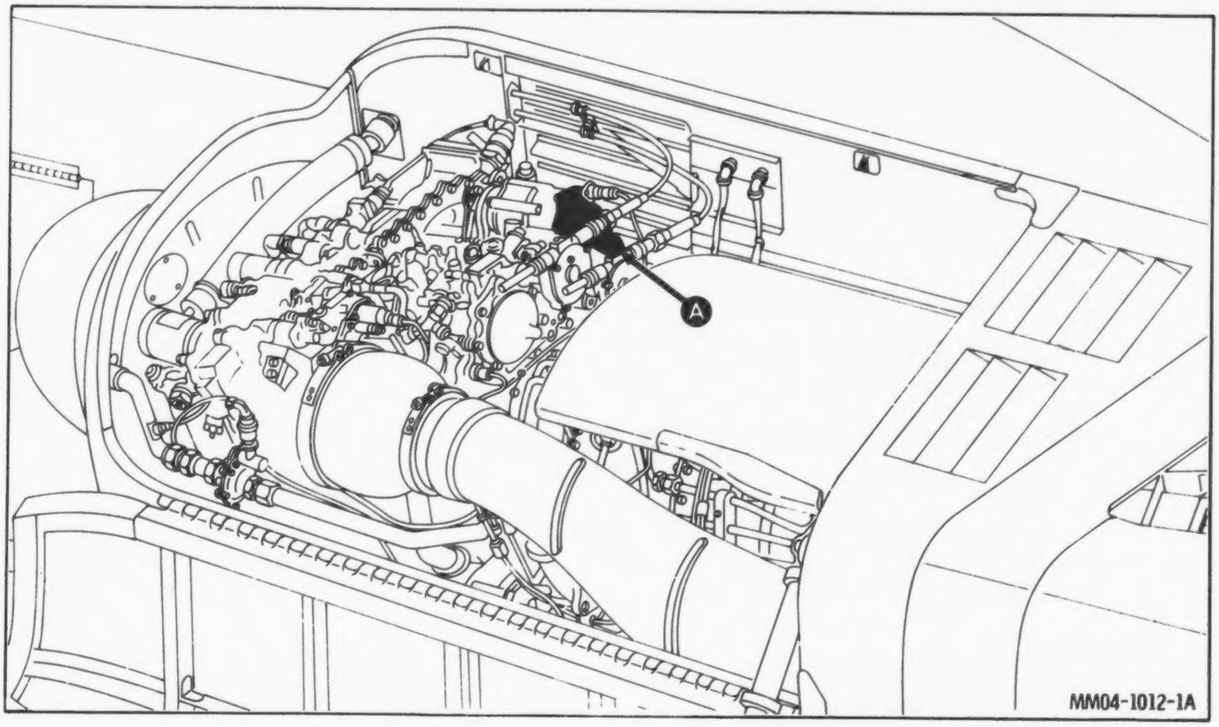
TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor



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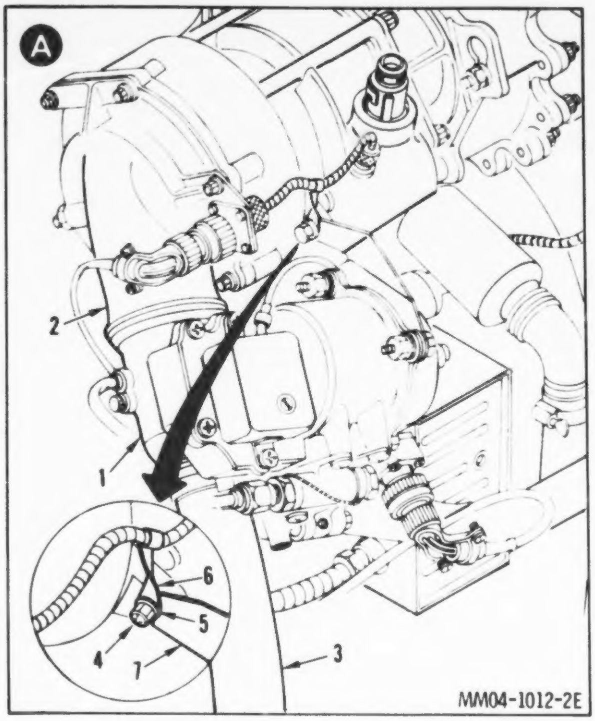
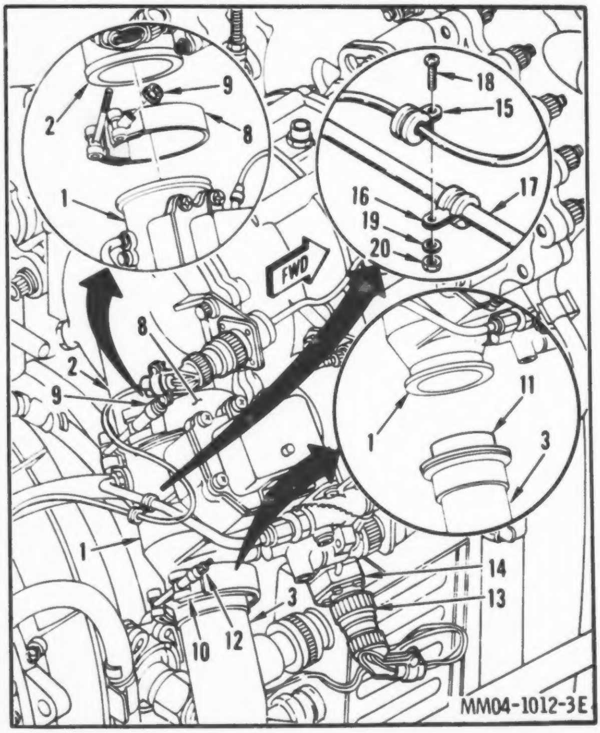
4-4-15. NO. 1 ENGINE REGULATING VALVE INSTALLATION (cont) 4-4-15

1. **Install regulating valve (1) on starter (2).**
   a. Position regulating valve (1) between starter (2) and starter air tube (3).
   b. Install bolt (4) through washer (5), clamp (6), and valve support (7).
   c. Tighten bolt (4).
2. **Install upper coupling (8) on valve (1) and starter (2).** Install nut (9).
3. **Install lower coupling (10) on valve (1) and starter air tube (3).**
   a. Install insert (11) between tube (3) and valve (1).
   b. Install tube (3) on valve (1).
   c. Position coupling (10) on valve (1) and tube (3).
   d. Install nut (12) on coupling (10).
4. **Torque nut (9) to 25 INCH-POUNDS.**
5. **Torque nut (12) to 25 INCH-POUNDS.**
6. **Attach connector P39 (13) to regulator connector L3 (14).** Lockwire connector (13) to connector (14). Use lockwire (E34).
7. **Install wire harness support clamps (15) and (16), on engine regulator valve tube (17).**
   a. Insert screw (18) into clamps (15) and (16).
   b. Hold screw (18). Install washer (19) and nut (20).
8. **Inspect (TI).**
9. **Perform power plant operational check (engine 1)**(TM 55-1520-238-T).
10. **Secure engine work platform door LN1** (para 2-2-2).

END OF TASK





4-4-16. NO. 2 ENGINE REGULATING VALVE REMOVAL 4-4-16

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

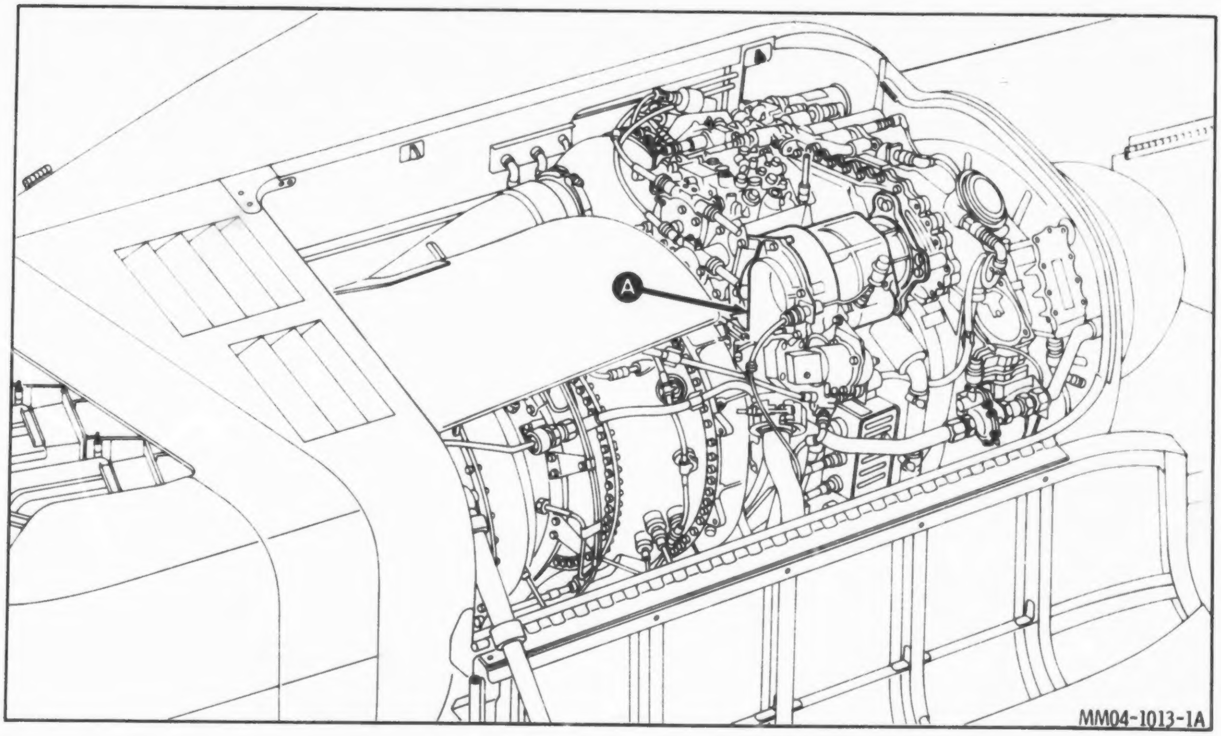
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R10 Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door RN2 opened



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4-4-16. NO. 2 ENGINE REGULATING VALVE REMOVAL (cont)

A. REMOVAL

1. Enter pilot station (para 1-7-1). Observe all safety precautions.

2. Open ENG START circuit breaker on pilot forward circuit breaker panel.

3. Detach connector P40 (1) from regulator valve connector L4 (2). Remove lockwire.

4. Remove wire harness support clamp (3) from engine regulating valve tube (4).

   a. Hold screw (5). Remove nut (6) and washer (7).

   b. Remove screw (5) from clamps (3) and (8).

5. Remove lower coupling (9) from regulator valve (10) and starter air tube (11). Remove nut (12).

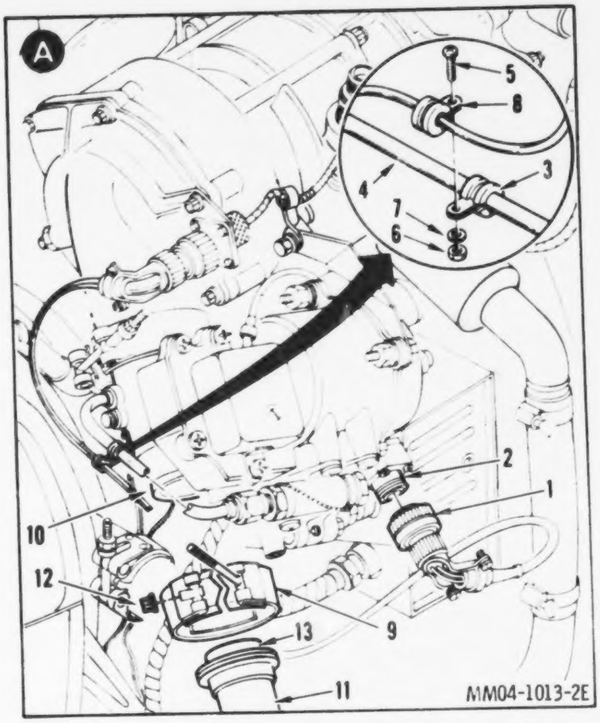
6. Remove insert (13) from tube (11).

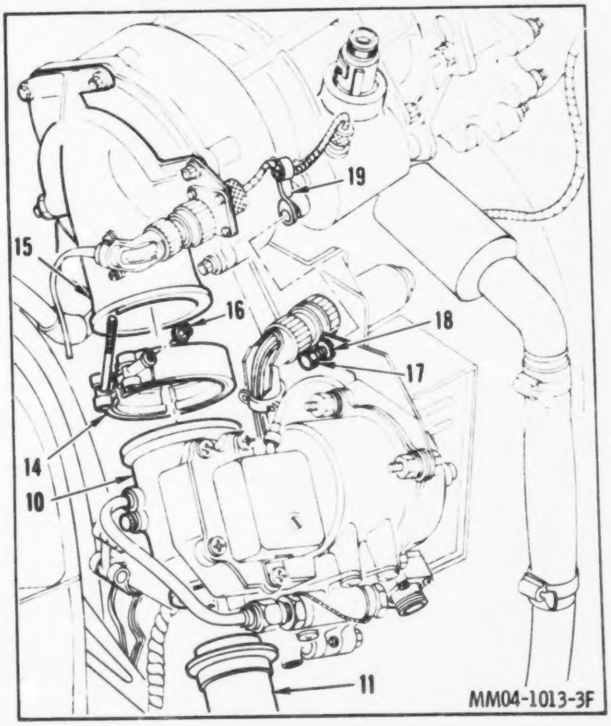
7. Remove coupling (14) from valve (10) and starter (15). Remove nut (16).

8. Remove valve (10) from starter (15).

   a. Remove bolt (17) and washer (18) from clamp (19) and starter (15).

   b. Slide valve (10) clear of starter (15) and tube (11).





B. CLEANING

Wipe all removed and attaching parts with a clean rag.

C. INSPECTION

1. Check regulating valve for cracks. None allowed.

2. Check regulating valve for corrosion (para 1-5-38).

END OF TASK

4-4-17. NO. 2 ENGINE REGULATING VALVE INSTALLATION 4-4-17

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Materials/Parts:

	Ref
(E34) Lockwire	

References:

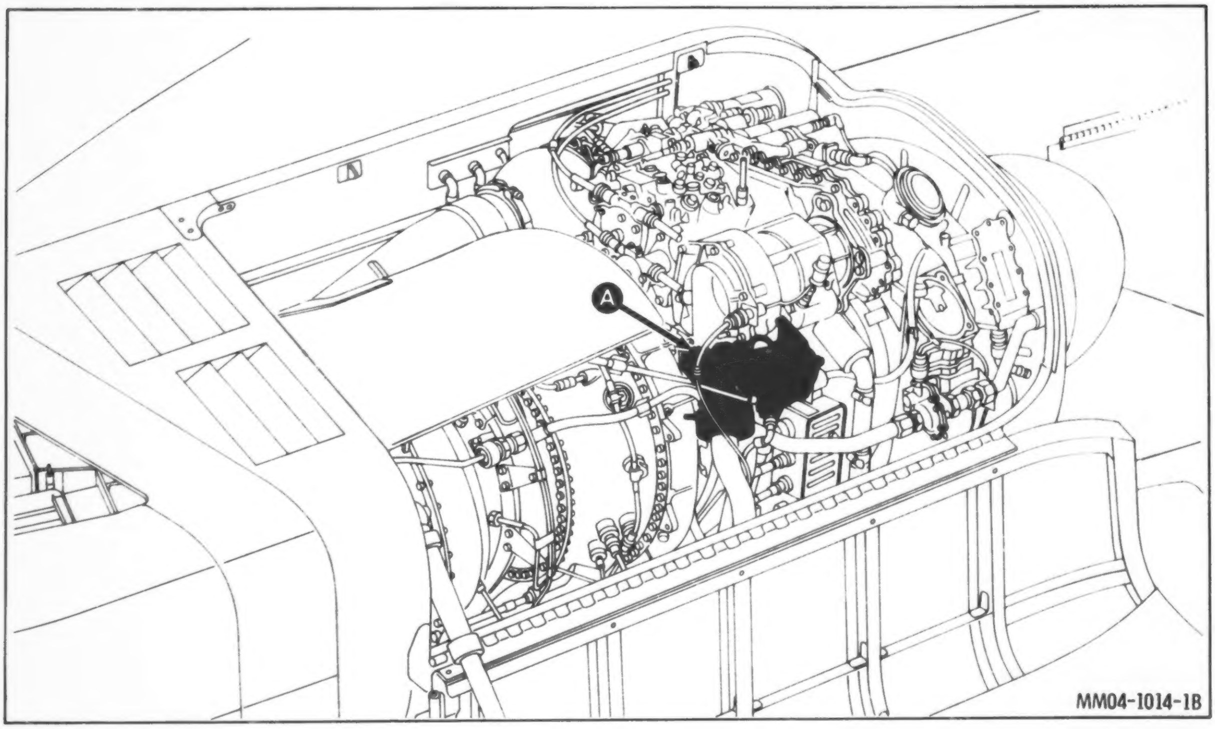
TM 55-1520-238-T

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Condition	
1-7-2	Helicopter safed



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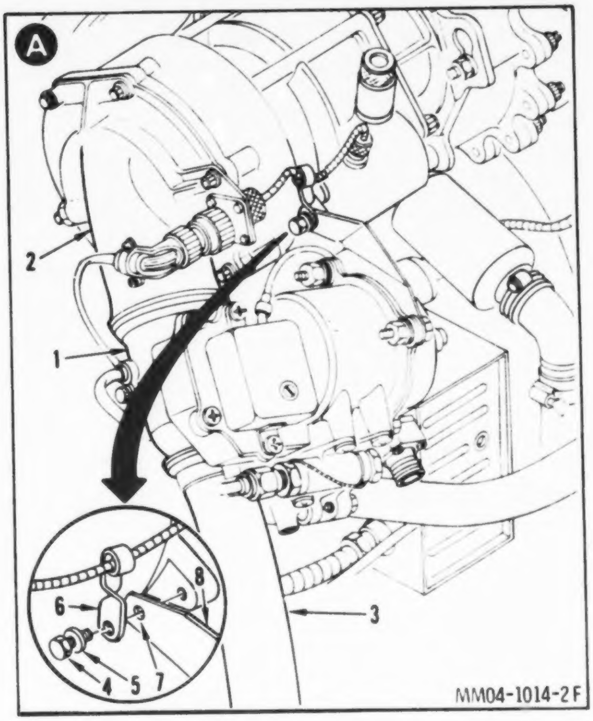
4-4-17. NO. 2 ENGINE REGULATING INSTALLATION (cont) 4-4-17

1. **Install regulating valve (1) on starter (2).**

   a. Position regulating valve (1) between starter (2) and starter air tube (3).

   b. Install bolt (4) through washer (5), clamp (6), and hole (7) on valve support (8).



2. **Install upper coupling (9) on valve (1) and starter (2).** Install nut (10).

3. **Install lower coupling (11) on valve (1) and tube (3).**

   a. Install insert (12) between tube (3) and valve (1).

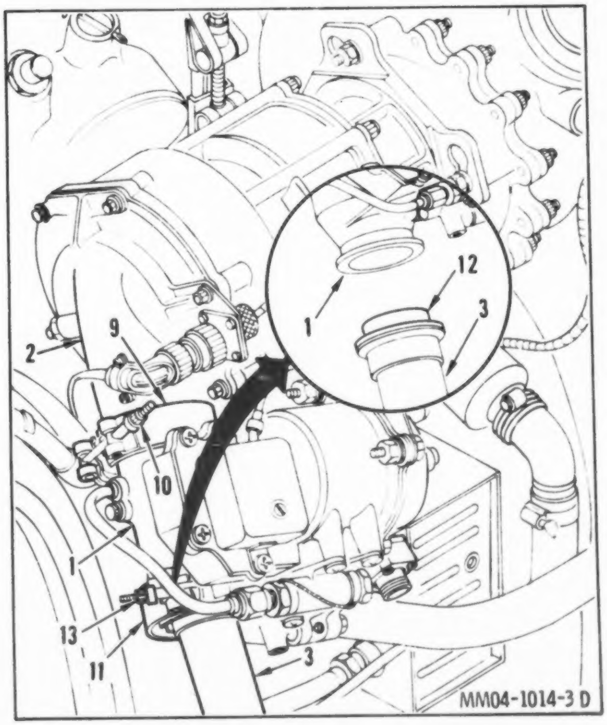
   b. Install tube (3) on valve (1).

   c. Position coupling (11) on valve (1) and tube (3).

   d. Install nut (13) on coupling (11).

4. **Torque nut (10) to 25 INCH-POUNDS.**

5. **Torque nut (13) to 25 INCH-POUNDS.**



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4-4-17. NO. 2 ENGINE REGULATING VALVE INSTALLATION (cont) 4-4-17

6. **Attach connector P40 (14) to regulator valve connector L4 (15).** Lockwire connector (14) to connector (15). Use lockwire (E34).

7. **Install wire harness support clamp (16) and (17) on tube (18).**

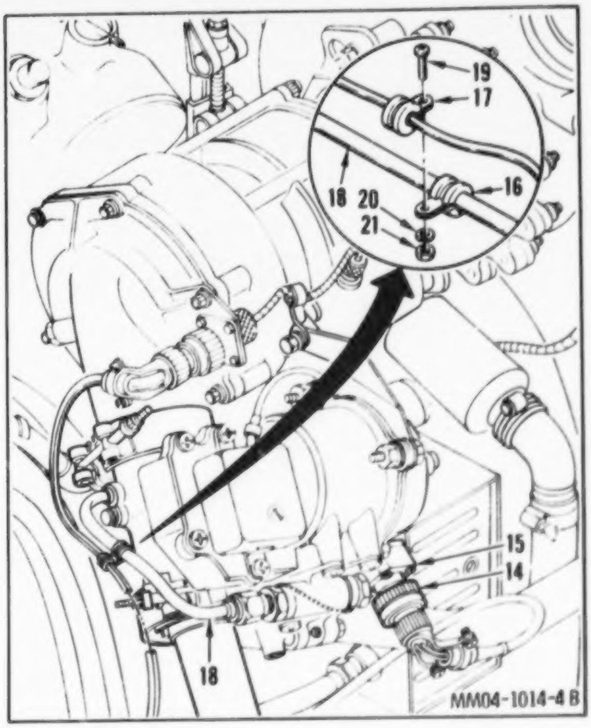
   a. Insert screw (19) through clamps (16) and (17).

   b. Hold screw (19). Install washer (20) and nut (21).

8. **Inspect (TI).**

9. **Perform power plant operational check (engine 1)** (TM 55-1520-238-T).

10. **Secure engine work platform door RN1** (para 2-2-2).



END OF TASK

4-4-18. NO. 1 ENGINE AIR STARTER REMOVAL/INSTALLATION 4-4-18

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Materials/Parts:

	Packing (2)
(E16)	Petrolatum

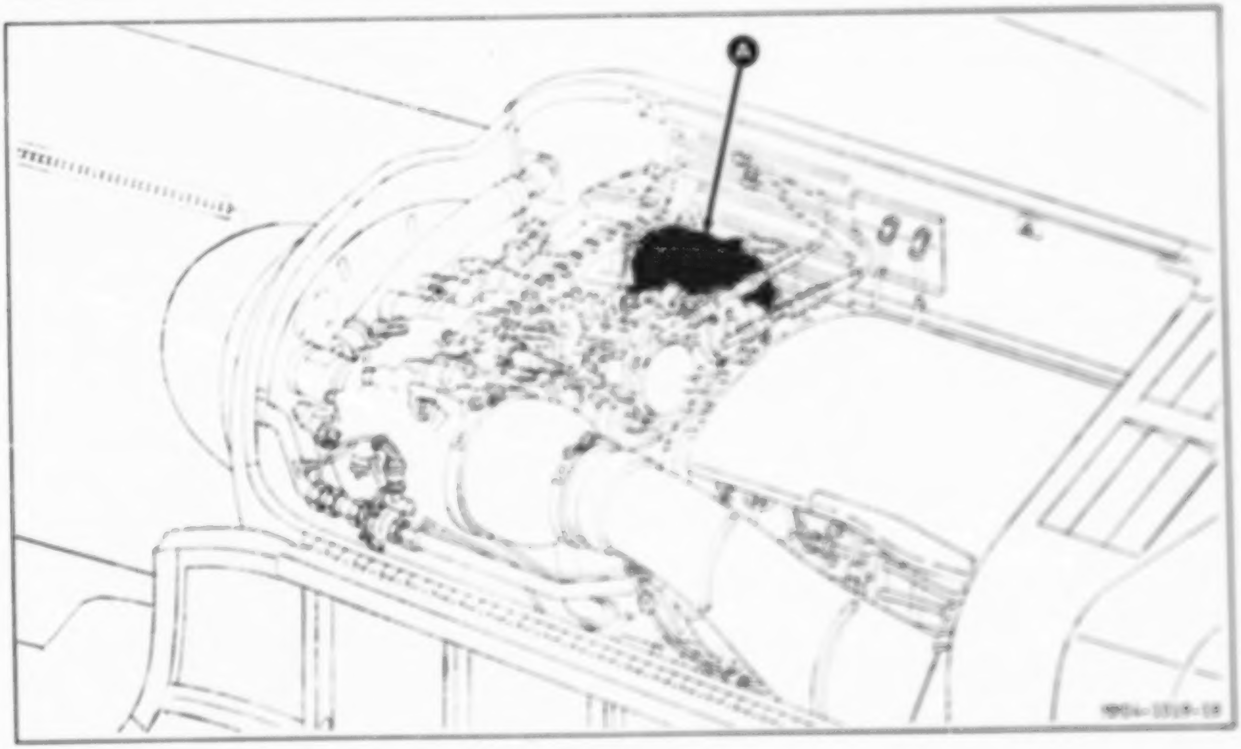
Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door LN1 opened
4-4-14	No. 1 regulating valve removed



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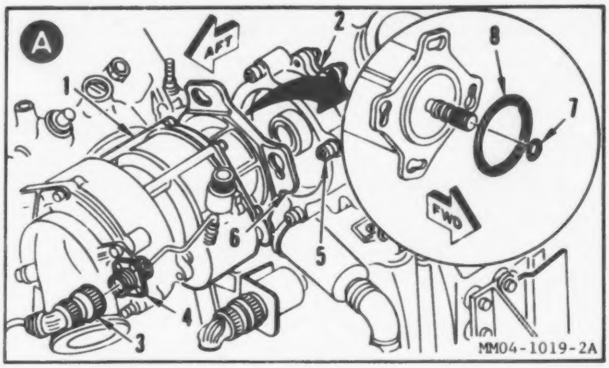
4-4-18. NO. 1 ENGINE AIR STARTER REMOVAL/INSTALLATION (cont) 4-4-18

A. REMOVAL



1. **Remove starter (1) from engine (2).**
   - a. Detach connector P35 (3) from connector A3 (4).
   - b. Loosen four nuts (5). **DO NOT REMOVE NUTS.**
   - c. Turn starter (1) clockwise until nuts (5) aline with slotted holes in flange (6).
   - d. Pull starter (1) from engine (2).
   - e. Remove and discard packings (7) and (8) from starter (1).

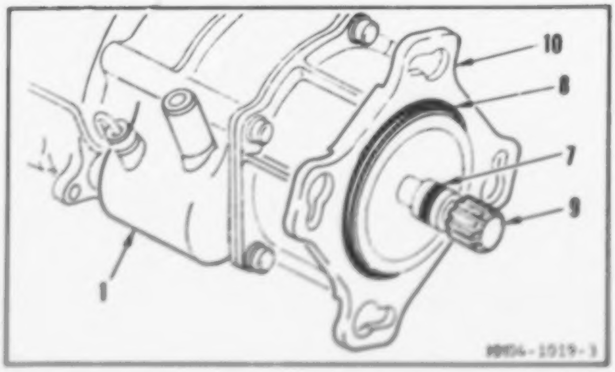
B. CLEANING

Wipe starter mounting area with a clean rag.

C. INSPECTION

1. **Visually check mounting area for cracks and chipped or worn splines.** None allowed.
2. **Check mating engine flange for nicks or scratches.** Maximum depth 0.015-inch allowed. No cracks allowed.

D. INSTALLATION



1. **Install new packings (7) and (8) on starter (1).**
   - a. Lubricate packings (7) and (8). Use petrolatum (E16).
   - b. Install packing (7) on starter shaft (9).
   - c. Install packing (8) on starter flange (10).

GO TO NEXT PAGE

4-4-18. NO. 1 ENGINE AIR STARTER REMOVAL/INSTALLATION (cont) 4-4-18

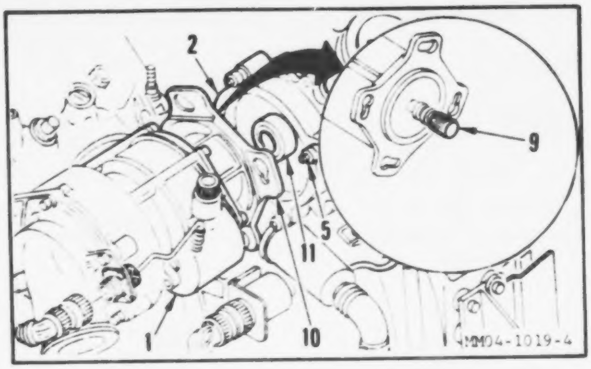
2. **Install starter (1) on engine (2).** Torque four nuts (5) to **120 INCH-POUNDS.**

   a. Aline starter shaft spline (9) with starter drive spline (11).

   b. Aline slotted holes in flange (10) with nuts (5).

   c. Put starter (1) in place on engine (2). Turn starter (1) counterclockwise to seat.

   d. Torque four nuts (5) to **120 INCH-POUNDS.**



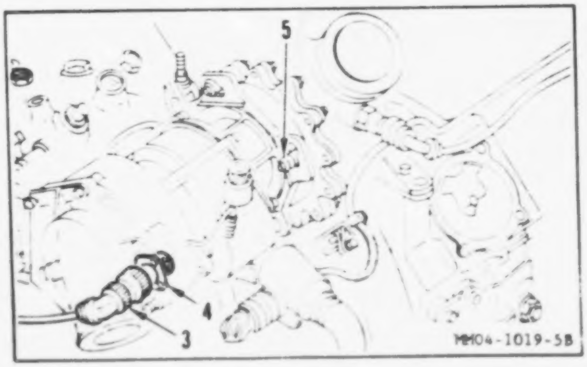
3. **Attach connector P35 (3) to starter connector A3 (4).**

4. **Inspect (TI).**

5. **Install No. 1 engine regulating** valve (para 4-4-15).

6. **Secure engine work platform door LN1** (para 2-2-2).

7. **Perform power plant operational check (engine 1)** (TM 55-1520-238-T).



END OF TASK

4-4-19. NO. 2 ENGINE AIR STARTER REMOVAL/INSTALLATION 4-4-19

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Material/Parts:

	Packing (2)
(E16)	Petrolatum

Personnel Required:

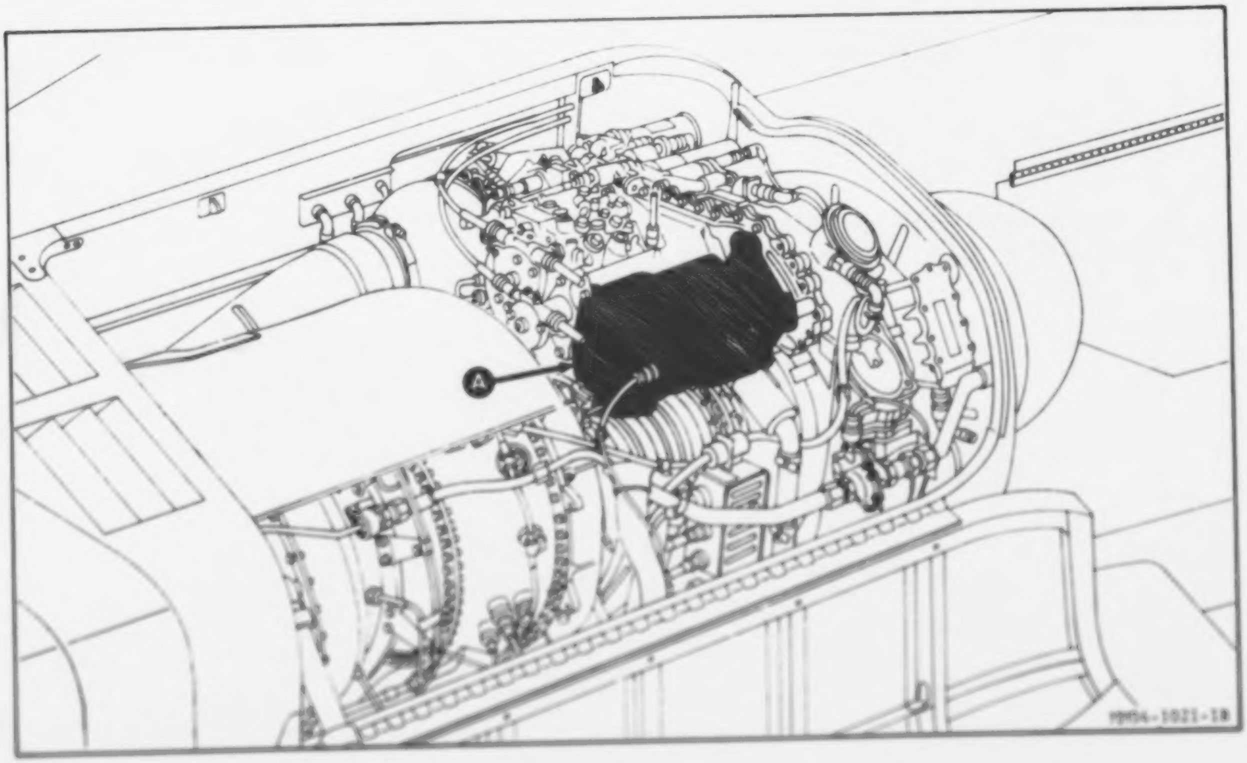
67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door RN2 opened
4-4-16	Regulating valve removed



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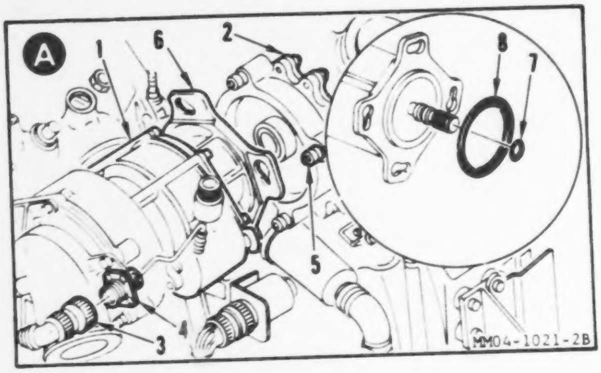
4-4-19. NO. 2 ENGINE AIR STARTER REMOVAL/INSTALLATION (cont)



A. REMOVAL

1. Remove starter (1) from engine (2).

   a. Detach connector P36 (3) from connector A4 (4).

   b. Loosen four nuts (5). **DO NOT REMOVE NUTS.**

   c. Turn starter (1) clockwise until nuts (5) aline with slotted holes in flange (6).

   d. Pull starter (1) from engine (2).

   e. Remove and discard packings (7) and (8) from starter (1).

B. CLEANING

Wipe starter mounting area with a clean rag.

C. INSPECTION

1. Visually check mounting area for cracks and chipped or worn splines. None allowed.

2. Check mating engine flange for nicks or scratches. Maximum depth 0.015-INCH. No cracks allowed.

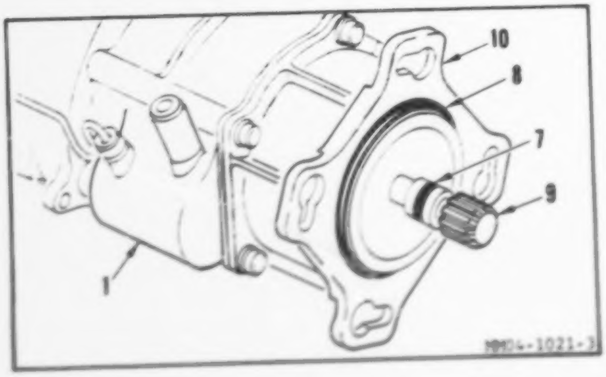
D. INSTALLATION

1. Install new packings (7) and (8) onto starter (1).

   a. Lubricate packings (7) and 8). Use petrolatum (E16).

   b. Install packing (7) on starter shaft (9).

   c. Install packing (8) on starter flange (10).



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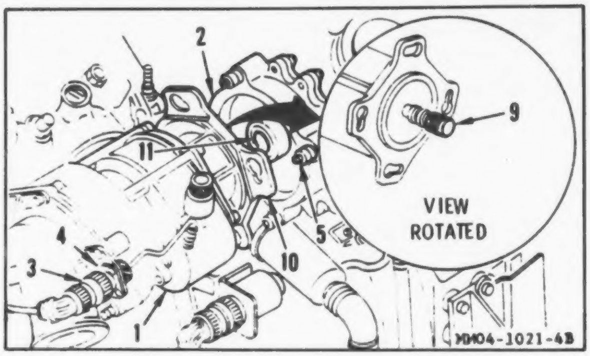
4-4-19. NO. 1 ENGINE AIR STARTER REMOVAL/INSTALLATION (cont) 4-4-19



2. **Install starter (1) on engine (2).** Torque four nuts (5) to **120 INCH-POUNDS.**
   - a. Aline starter shaft spline (9) with starter drive spline (11).
   - b. Aline slotted holes in flange (10) with nuts (5).
   - c. Put starter (1) in place on engine (2) and turn counterclockwise to seat.
   - d. Torque four nuts (5) to **120 INCH-POUNDS.**
3. **Attach connector P36 (3) to starter connector A4 (4).**
4. **Inspect (TI).**
5. **Install No. 2 engine regulating valve** (para 4-2-53).
6. **Secure engine work platform door RN2** (para 2-2-2).
7. **Perform power plant operational check (engine 2)** (TM 55-1520-238-T).

END OF TASK

Section V. GENERAL ENGINE MAINTENANCE

4-5-1. NO. 1 ENGINE OIL PRESSURE TRANSMITTER REMOVAL/INSTALLATION 4-5-1

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Materials/Parts:

	Packing
(E16)	Petrolatum

Personnel Required:

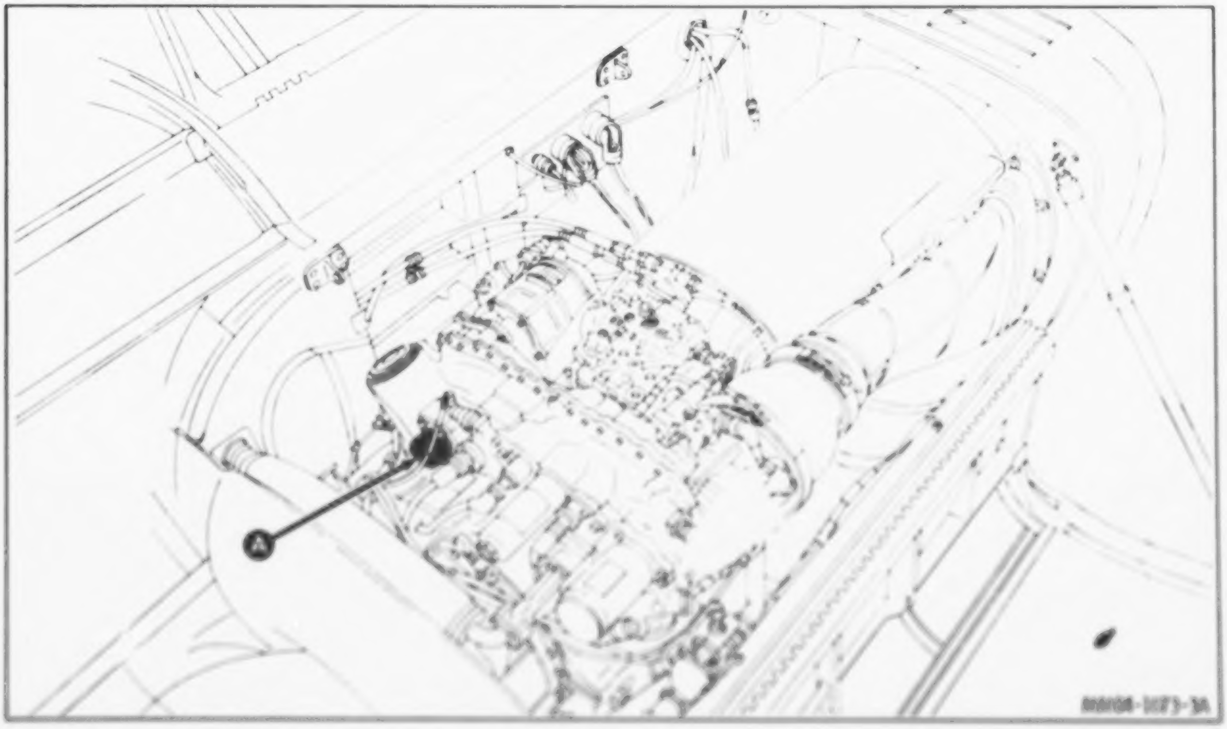
67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

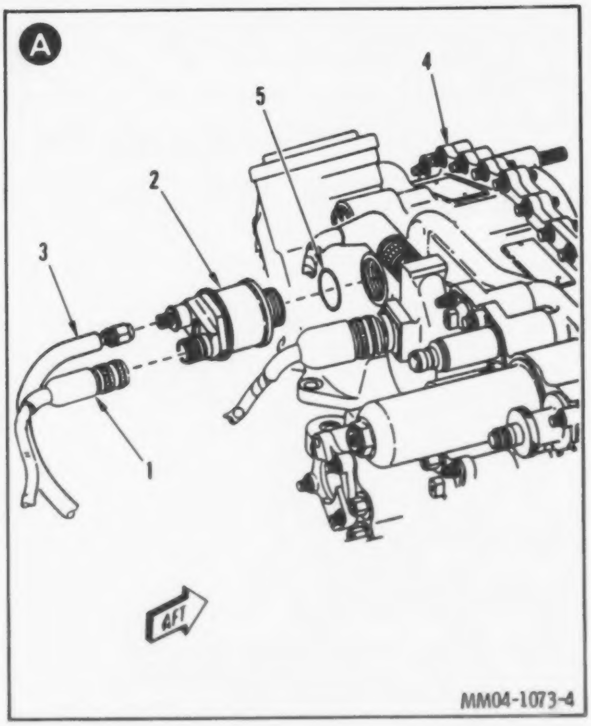
TM 55-1520-238-T
TM 55-2840-248-23

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door LN1 opened



4-5-1. NO. 1 ENGINE OIL PRESSURE TRANSMITTER REMOVAL/INSTALLATION (cont) 4-5-1



A. REMOVAL

1. Detach connector (1) from oil pressure transmitter (2).
2. Detach oil sump pressure tube (3) from transmitter (2).
3. Remove transmitter (2) from accessory gearbox (4).
4. Remove and discard packing (5) from transmitter (2).

B. CLEANING

Clean all removed and attaching parts (para 1-5-36).

C. INSPECTION

1. Check pressure sensor and pressure tube for cracks and charring. None allowed.
2. Check sump pressure tube for nicks, cuts, and gouges. Maximum depth not to exceed 0.060 inch if braid is not visible.
3. Check connector for kinks or bends (TM 55-2840-248-23).

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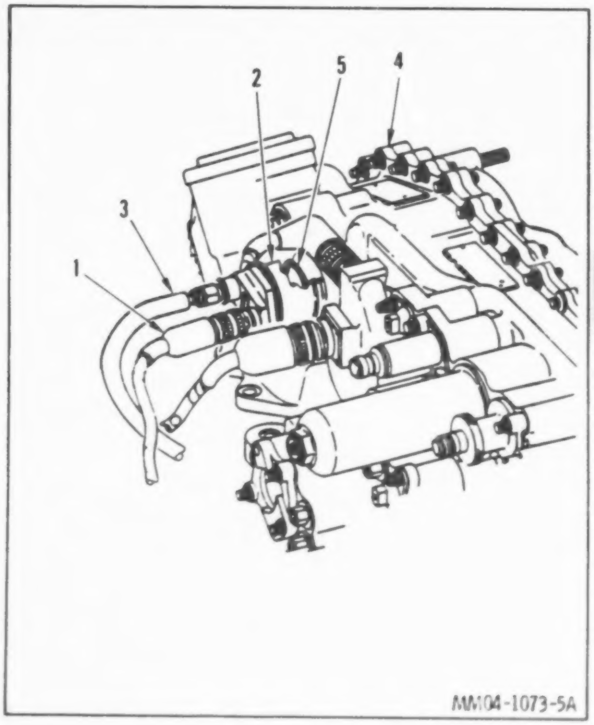
4-5-1. NO. 1 ENGINE OIL PRESSURE TRANSMITTER REMOVAL/INSTALLATION (cont) 4-5-1

D. INSTALLATION

1. Lubricate new packing (5) and threads of transmitter (2). Use petrolatum (E16).
2. Install new packing (5) on transmitter (2).
3. Install transmitter (2) on accessory gearbox (4).
4. Attach connector J1 (1) to oil pressure transmitter (2).
5. Attach oil sump pressure tube (3) to transmitter (2).
6. Inspect (TI).
7. Secure engine work platform door LN1 (para 2-2-2).
8. Perform drive system dynamic operational check (TM 55-1520-238-T).



END OF TASK

4-5-2. NO. 2 ENGINE OIL PRESSURE TRANSMITTER REMOVAL/INSTALLATION 4-5-2

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Materials/Parts:

	Packing
(E16)	Petrolatum

Personnel Required:

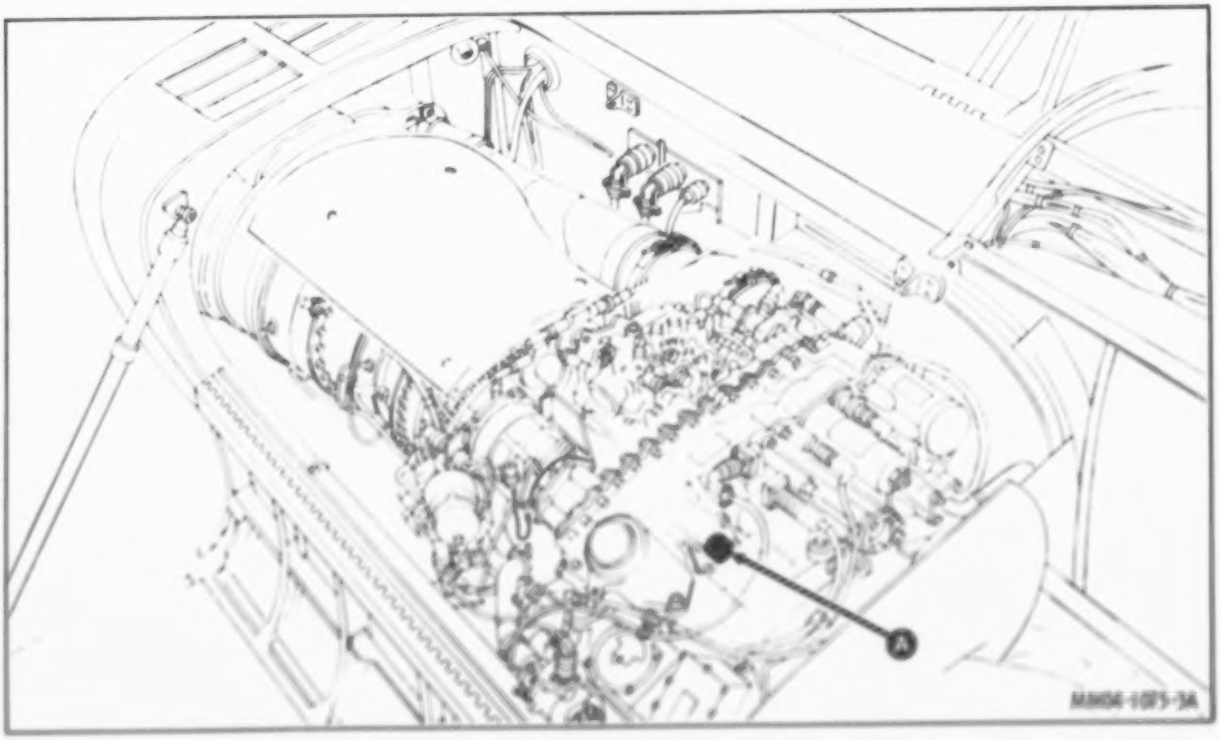
67R10 Attack Helicopter Repairer
66R30 Inspector/Supervisor

References:

TM 55-1520-238-T
TM 55-2840-248-23

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door RN2 opened



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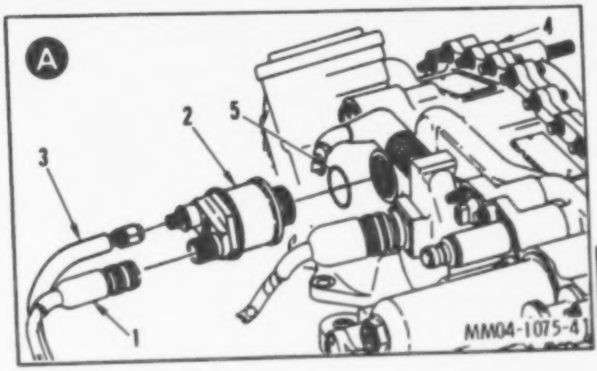
4-5-2. NO. 2 ENGINE OIL PRESSURE TRANSMITTER REMOVAL/INSTALLATION (cont) 4-5-2



A. REMOVAL

1. Detach connector W3P6 (1) from oil pressure transmitter (2).
2. Detach oil sump pressure tube (3) from transmitter (2).
3. Remove transmitter (2) from accessory gearbox (4).
4. Remove and discard packing (5) from transmitter (2).

B. CLEANING

Clean all removed and attaching parts (para 1-5-36).

C. INSPECTION

1. Inspect pressure sensor and pressure tube for cracks and charring. None allowed.
2. Inspect sump pressure tube for nicks, cuts, and gouges. Maximum depth not to exceed 0.060 inch if braid is not visible.
3. Inspect connector W3P6 for kinks or bends (TM 55-2840-248-23).

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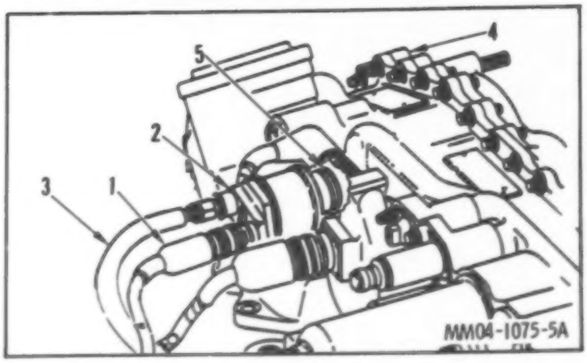
4-5-2. NO. 2 ENGINE OIL PRESSURE TRANSMITTER REMOVAL/INSTALLATION (cont) 4-5-2



D. INSTALLATION

1. Lubricate new packing (5) and threads of transmitter (2).
   Use petrolatum (E16).
2. Install new packing (5) on transmitter (2).
3. Install transmitter (2) on gearbox (4).
4. Attach connector W3P6 (1) to transmitter (2).
5. Attach tube (3) to transmitter (2).
6. Inspect (TI).
7. Secure engine work platform access door RN2 (2-2-2).
8. Perform drive system dynamic operational check (TM 55-1520-238-T).

END OF TASK

4-5-3. ENGINE SHROUD SEAL RING REMOVAL/INSTALLATION 4-5-3

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powerplant	5180-00-323-4944
Wrench, Torque 1/4 Drive	5120-00-542-4489

Personnel Required:

68B10	Attack Powerplant Repairer
66R30	Inspector/Supervisor

References:

TM 55-2840-248-23

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-2-3	No. 1 engine or
4-2-8	No. 2 engine removed

NOTE

This task is typical for No. 1 or No. 2 engine shroud seal ring.

A. REMOVAL

Remove ring (1) from C-sump housing (2). Remove four nuts (3) and washers (4) from four studs (5).

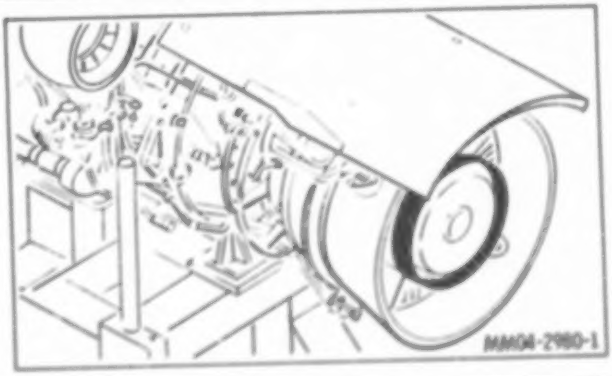
B. CLEANING

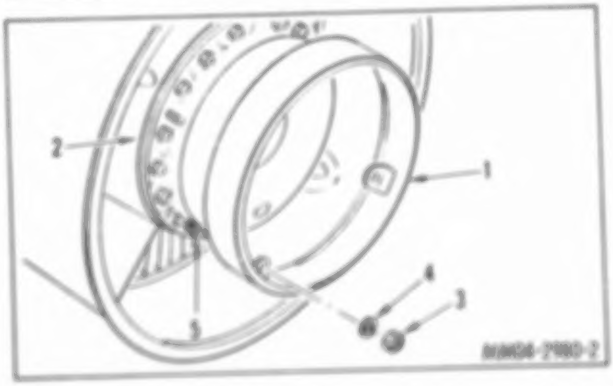
Clean housing (para 1-5-36).

C. INSPECTION

1. Check housing for cracks and studs for stripped threads. None allowed.

2. Check housing for corrosion (TM 55-2840-248-23).





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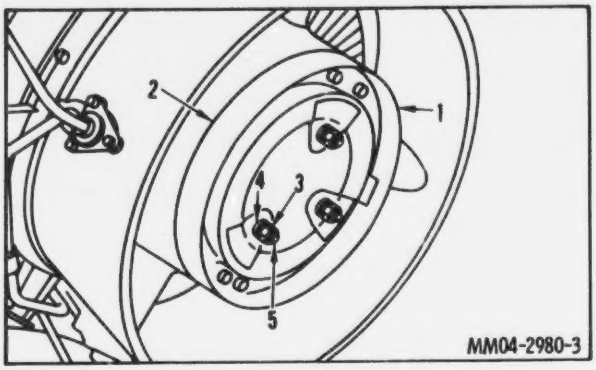
4-5-3. ENGINE SHROUD SEAL RING REMOVAL/INSTALLATION (cont) 4-5-3



D. INSTALLATION

1. **Install ring (1) on C-sump housing (2).** Torque four nuts (3) to **45 INCH-POUNDS.**

   a. Positioning ring (1) on housing (2), install four washers (4) and nuts (3) on four studs (5).

   b. Torque four nuts (3) to **45 INCH-POUNDS.**

2. **Inspect (TI).**

3. **Install No. 1 engine** (para 4-2-43) **or No. 2 engine** (para 4-2-47).

END OF TASK

4-5-4. NO. 1 OR NO. 2 ENGINE WATER WASH COUPLING HALF REMOVAL/INSTALLATION 4-5-4

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Crowfoot attachment 7/8, 3/8 drive	5120-00-541-4071

Materials/Parts:

	Packing
(E16)	Petrolatum

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door LN2 or RN2 opened

NOTE

This task is typical for No. 1 or No. 2 engine water wash coupling.

A. REMOVAL

1. **Remove coupling half (1) from swirl frame (2).**

2. **Remove and discard packing (3).**

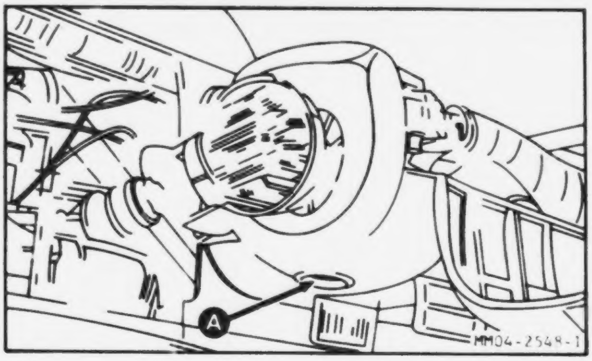
B. CLEANING

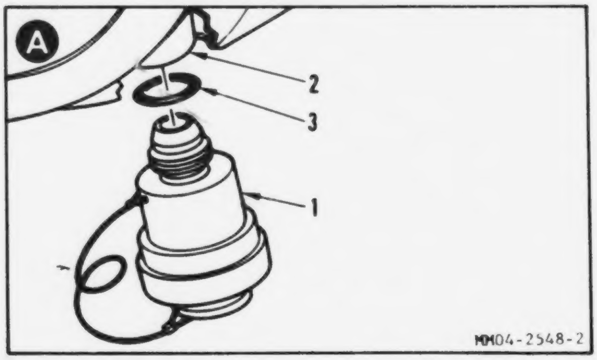
Clean coupling boss on frame (para 1-5-36).

C. INSPECTION

1. **Check boss on frame for damaged threads.** None allowed.

2. **Check frame for corrosion** (para 1-5-38).





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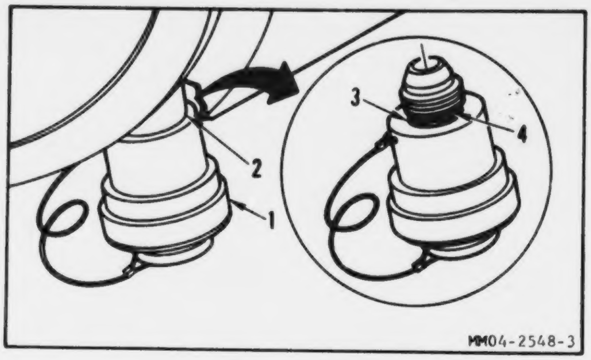
4-5-4. NO. 1 OR NO. 2 ENGINE WATER WASH COUPLING HALF REMOVAL/INSTALLATION (cont) 4-5-4

D. INSTALLATION



1. **Install new packing (3) on coupling half (1).**
   a. Lubricate new packing (3). Use petrolatum (E16).
   b. Install packing (3) in coupling half groove (4).
2. **Install coupling half (1) in frame (2).** Torque coupling half (1) to **130 INCH-POUNDS.** Use 7/8 crowfoot attachment.
3. **Inspect (TI).**
4. **Secure engine work platform door LN1 or RN2** (para 2-2-2).

END OF TASK

4-5-5. NO. 1 OR NO. 2 ENGINE OIL CHIP COLLECTOR REMOVAL/INSTALLATION 4-5-5

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Crowfoot attachment 3/4, 3/8 drive	5120-00-184-8400

Materials/Parts:

	Packing
(E12)	Sealant
(E42)	Oil

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

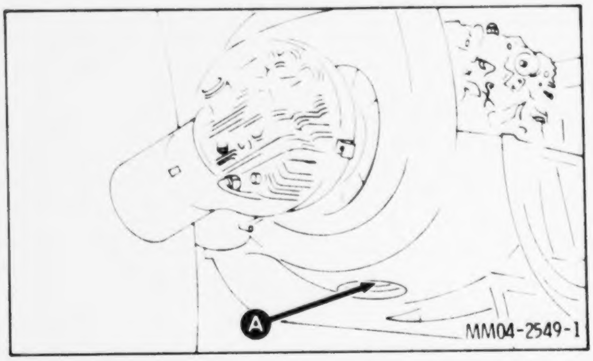
References:

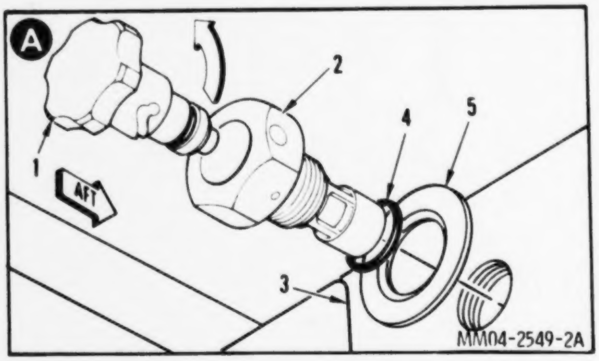
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door LN2 or RN2 opened
1-5-13	Engine oil system drained

NOTE

This task is typical for No. 1 or No. 2 engine chip collector.





A. REMOVAL

1. **Remove probe (1) from chip collector (2).** Push in probe and turn counterclockwise.

2. **Remove collector (2) from oil sump (3).**

3. **Remove and discard packing (4).**

4. **Remove washer (5) from sump (3).**

B. CLEANING

Clean collector boss on sump (para 1-5-36).

C. INSPECTION

Check sump for corrosion (para 1-5-38).

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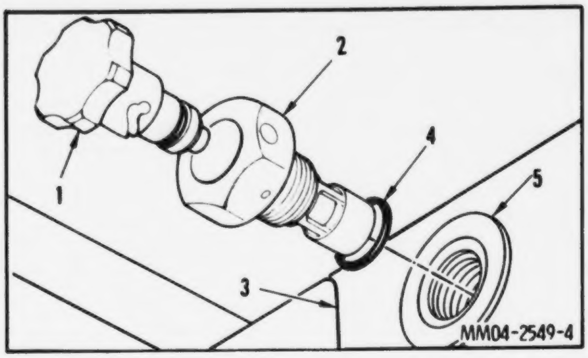
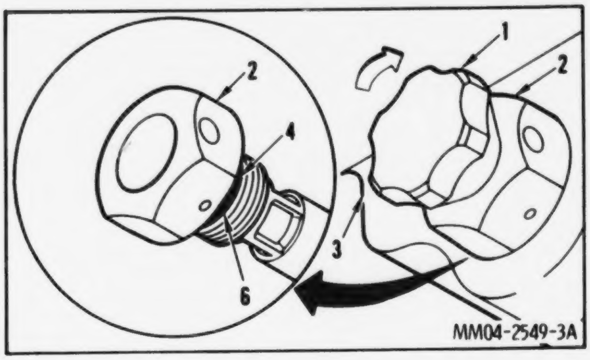
4-5-5. NO. 1 OR NO. 2 ENGINE OIL CHIP COLLECTOR REMOVAL/INSTALLATION (cont)





D. **INSTALLATION**

1. **Install washer (5) on sump (3).**
   a. Apply sealant to washer (5) on side opposite the countersink. Use sealant (E12).

   b. Aline hole in washer (5) with chip collector (2) mounting hole. Press in place. Wipe excess sealant with a clean dry rag.

2. **Install new packing (4) on chip collector (2).**
   a. Lubricate new packing (4). Use oil (E42).

   b. Install packing (4) in collector groove (6).

3. **Install chip collector (2) in sump (3).** Torque collector (2) to **130 INCH-POUNDS**. Use 3/4 crowfoot attachment.

NOTE

Probe is properly installed when knurl tips and hex points aline.

4. **Install probe (1) in collector (2).** Push and turn probe clockwise.

5. **Service No. 1 or No. 2 engine oil system** (para 1-5-13).

6. **Inspect (TI).**

7. **Secure engine work platform door LN2 or RN2** (para 2-2-1).

8. **Perform power plant operational check (engine 1 or engine 2)** (TM 55-1520-238-T).

END OF TASK

4-5-6. NO. 1 AND NO. 2 ENGINE GEARBOX DRAIN HOSE REMOVAL/INSTALLATION 4-5-6

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Crowfoot Attachment, 9/16, 1/4 Drive	5120-00-541-4074
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Personnel Required:

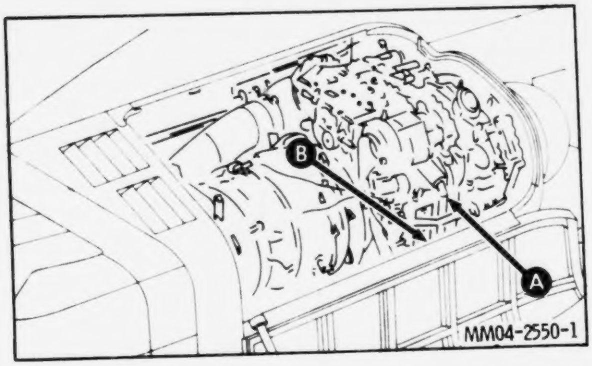
67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

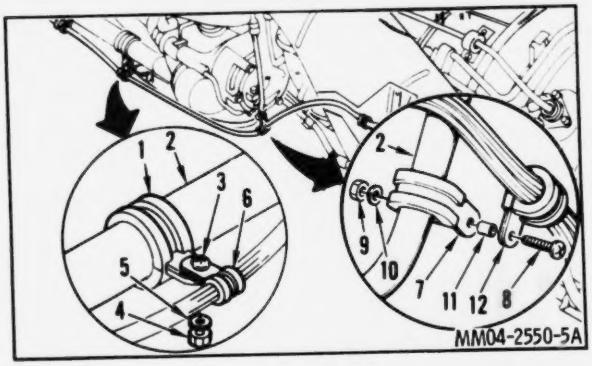
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform doors LN1, LN3, and LN4,or RN1, RN3, and RN4 opened.

NOTE

This task is typical for No. 1 or No. 2 engine gearbox drain hose.





A. REMOVAL

1. **Remove wire harness support clamp (1) on HMU drain hose (2).**
   a. Hold screw (3). Remove nut (4) and washer (5).
   b. Remove screw (3) from clamps (1) and (6).
2. **Remove wire harness support clamp (7) on hose (2).**
   a. Hold screw (8). Remove nut (9) and washer (10).
   b. Remove screw (8) from clamp (7), spacer (11), and clamp (12).

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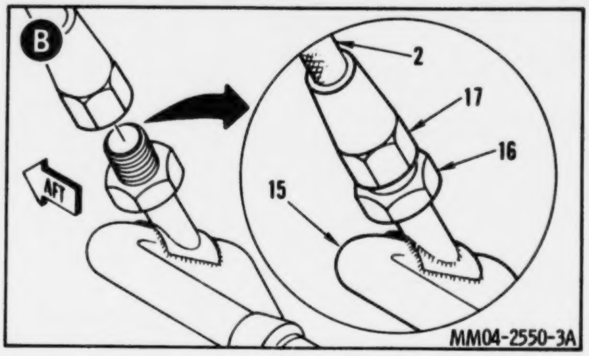
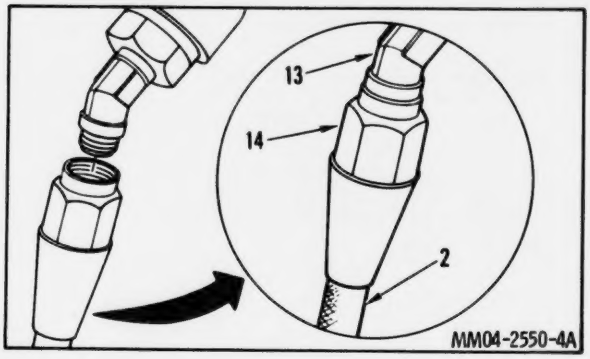
4-5-6. NO. 1 AND NO. 2 ENGINE GEARBOX DRAIN HOSE REMOVAL/INSTALLATION (cont) 4-5-6





3. **Disconnect hose (2) from vent drain elbow (13).**

   a. Hold elbow (13). Remove nut (14).

   b. Disconnect drain hose (2) from manifold (15).

   c. Hold adapter (16). Remove nut (17).

B. CLEANING

Clean elbow and adapter (Para 1-5-36).

C. INSPECTION

1. **Check elbow for damaged threads.** None allowed.

2. **Check adapter for damaged threads or looseness.** None allowed.

3. **Check elbow and adapter for corrosion** (para 1-5-38).

D. INSTALLATION

1. **Connect hose (2) to manifold (15).** Torque nut (17) to **50 INCH-POUNDS.**

   a. Install nut (17) on adapter (16).

   b. Hold adapter (16).

   c. Torque nut (17) to **50 INCH-POUNDS.** Use 9/16 crowfoot.

2. **Connect hose (2) to elbow (13).** Torque nut (14) to **85 INCH-POUNDS.**

   a. Install nut (14) on elbow (13).

   b. Hold elbow (13).

   c. Torque nut (14) to **85 INCH-POUNDS.** Use 9/16 crowfoot.

GO TO NEXT PAGE

4-5-6. NO. 1 AND NO. 2 ENGINE GEARBOX DRAIN HOSE REMOVAL/INSTALLATION (cont)

3. Install clamp (1) on hose (2).

a. Insert screw (3) through clamps (1) and (6).

b. Install washer (5) and nut (4).

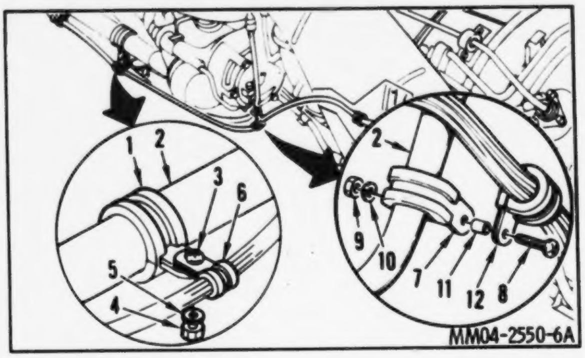
4. Install wire harness support clamp (7) on hose (2).

a. Insert screw (8) through clamp (12), spacer (11), and clamp (7).

b. Install washer (10) and nut (3).

5. Inspect (TI).

6. Secure engine work platform doors LN1, LN3, and LN4, or RN1, RN3, and RN4 (para 2-2-2).



END OF TASK

4-5-7. NO. 1 ENGINE PRESSURE AND OVERSPEED UNIT DRAIN HOSE REMOVAL/INSTALLATION 4-5-7

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

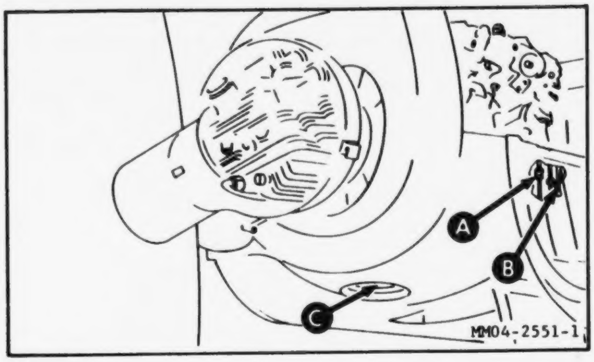
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Crowfoot Attachment, 9/16, 1/4 Drive	5120-00-541-4074
Wrench, Torque, 1/4 Drive	5120-00-542-4489

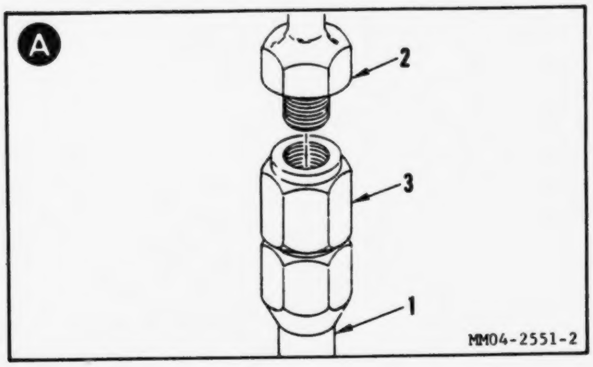
Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform doors LN1 and LN3 opened.





A. REMOVAL

1. **Disconnect No. 1 engine pressure and overspeed unit (POU) drain hose (1) from adapter (2).**

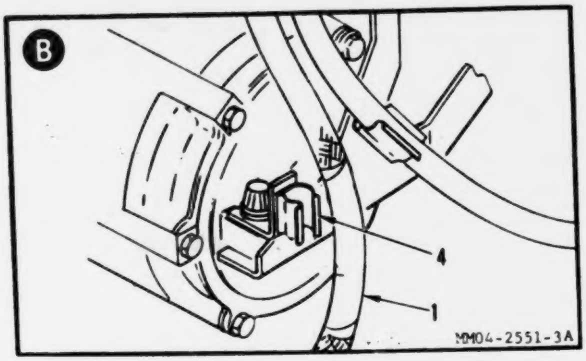
   a. Hold adapter (2).

   b. Remove nut (3).

GO TO NEXT PAGE

4-5-7. NO. 1 ENGINE PRESSURE AND OVERSPEED UNIT DRAIN HOSE REMOVAL/INSTALLATION (cont)

2. **Remove hose (1) from clip (4).**



3. **Disconnect hose (1) from engine drain manifold (5).**

   a. Hold adapter (6).

   b. Remove nut (7).

B. **CLEANING**

Clean adapters (para 1-5-36).

C. **INSPECTION**

1. **Check adapters for damaged threads or looseness.** None allowed.

2. **Check adapters for corrosion** (para 1-5-38).

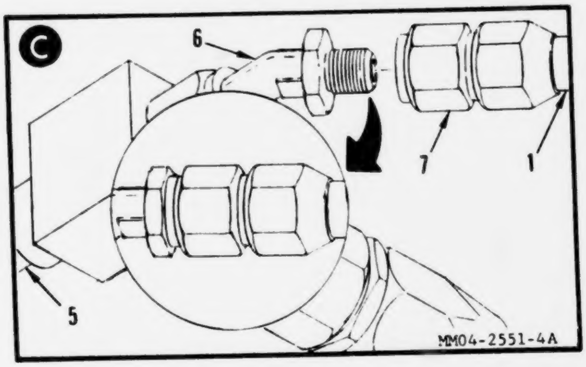
D. **INSTALLATION**

1. **Connect hose (1) to manifold (5).** Torque nut (7) to **85 INCH-POUNDS.**

   a. Install nut (7) on adapter (6).

   b. Hold adapter (6).

   c. Torque nut (7) to **85 INCH-POUNDS.** Use crowfoot.



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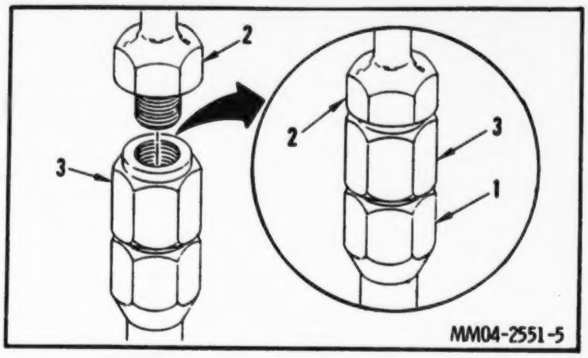
4-5-7. NO. 1 ENGINE PRESSURE AND OVERSPEED UNIT DRAIN HOSE REMOVAL/INSTALLATION (cont) 4-5-7

2. **Connect hose (1) to adapter (2).** Torque nut (3) to **60 INCH-POUNDS.**

   a. Install nut (3) on adapter (2).

   b. Hold adapter (2).

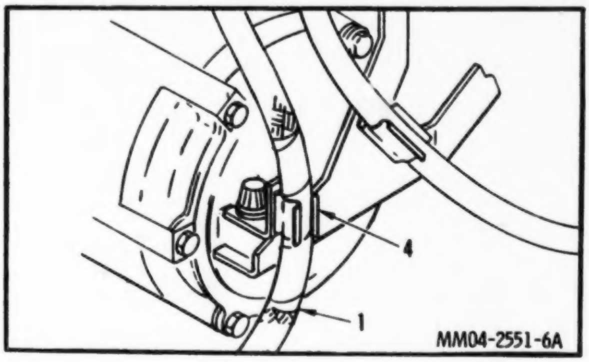
   c. Torque nut (3) to **60 INCH-POUNDS.** Use crowfoot.



3. **Install hose (1) in clip (4).**

4. **Inspect (TI).**

5. **Secure engine work platform doors LN1 and LN3** (para 2-2-2).



END OF TASK

4-5-8. NO. 2 ENGINE PRESSURE AND OVERSPEED UNIT DRAIN HOSE REMOVAL/INSTALLATION 4-5-8

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Crowfoot Attachment, 9/16, 1/4 Drive	5120-00-541-4074
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Personnel Required:

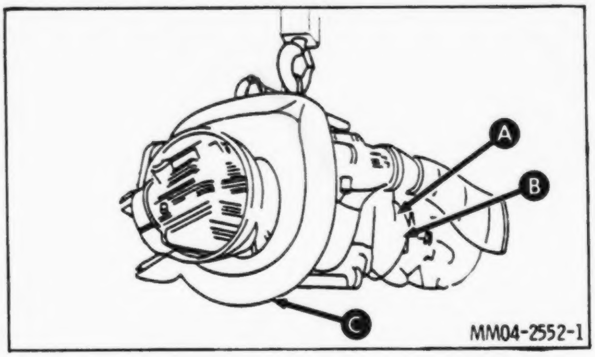
67R10 Attack Helicopter Repairer
66R30 Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

A. REMOVAL

1. **Remove No. 2 engine from** nacelle (para 4-2-8).



2. **Remove wire harness support clamp (1) from drain hose (2).**

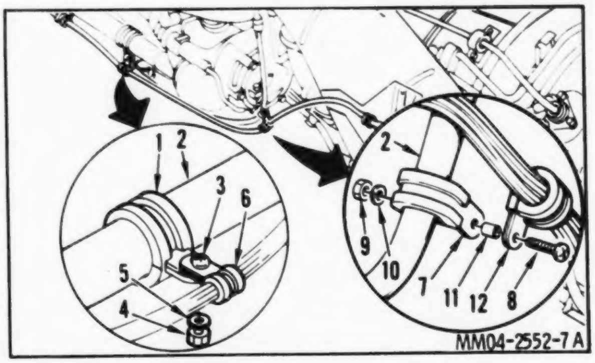
   a. Hold screw (3). Remove nut (4) and washer (5).

   b. Remove screw (3) from clamps (1) and (6).

3. **Remove wire harness support clamp (7) from drain hose (2).**

   a. Hold screw (8). Remove nut (9) and washer (10).

   b. Remove screw (8) from clamp (7), spacer (11), and clamp (12).



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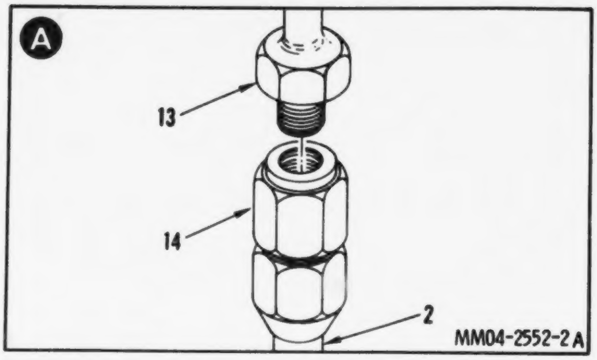
4-5-8. NO. 2 ENGINE PRESSURE AND OVERSPEED UNIT DRAIN HOSE REMOVAL/INSTALLATION (cont) 4-5-8

4. Disconnect No. 2 engine pressure and overspeed unit (POU) drain hose (2) from adapter (13).

a. Hold adapter (13).

b. Remove nut (14).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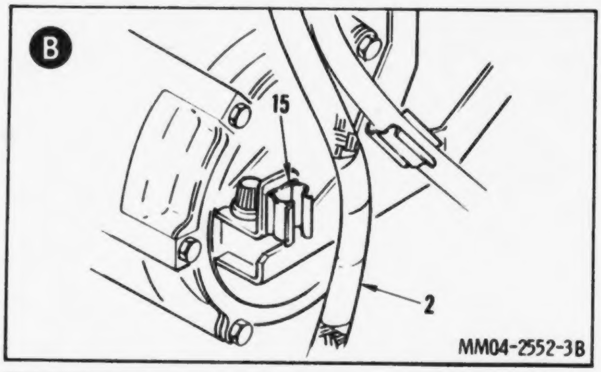
MM04-2552-2A

5. Remove hose (2) from clip (15).


B
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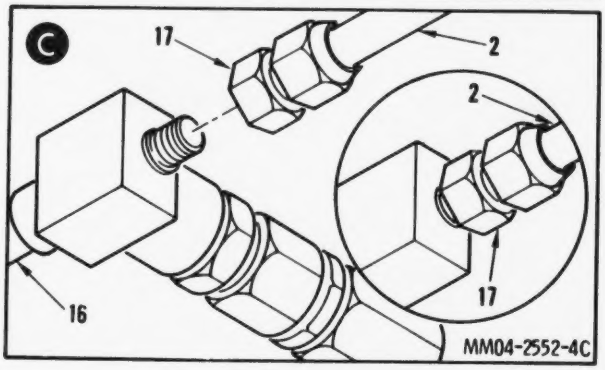
MM04-2552-3B

6. Disconnect hose (2) from engine drain manifold (16). Remove nut (17).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MM04-2552-4C

B. CLEANING

Clean adapter (para 1-5-36).

C. INSPECTION

1. Check adapter for damaged threads or looseness. None allowed.

2. Check adapter for corrosion (para 1-5-38).

GO TO NEXT PAGE

4-5-8. NO. 2 ENGINE PRESSURE AND OVERSPEED UNIT DRAIN HOSE REMOVAL/INSTALLATION (cont) 4-5-8

D. INSTALLATION

1. **Connect hose (2) to drain manifold (16).** Torque nut (17) to **85 INCH-POUNDS.** Use crowfoot.

2. **Connect hose (2) to adapter (13).** Torque nut (14) to **60 INCH-POUNDS.**
   a. Install nut (14) on adapter (13).
   b. Hold adapter (13).
   c. Torque nut (14) to **60 INCH-POUNDS.** Use crowfoot.

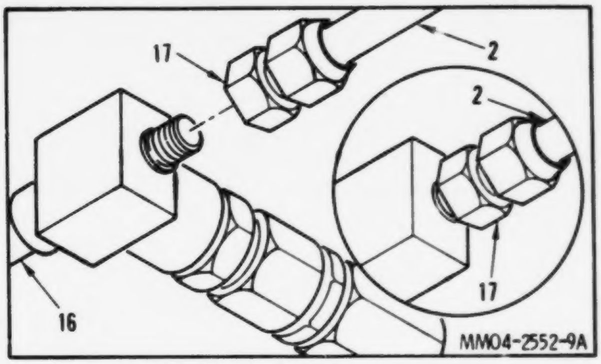
3. **Install hose (2) in clip (15).**

4. **Install clamps (1) and (6) on hose (2).**
   a. Insert screw (3) in clamps (1) and (6).
   b. Install washer (5) and nut (4).

5. **Install clamps (7) and (12) on hose (2).**
   a. Insert screw (8) through clamp (12), spacer (11), and clamp (7).
   b. Hold screw (8). Install washer (10) and nut (9).

6. **Inspect (TI).**

7. **Install No. 2 engine in nacelle (para 4-2-48).**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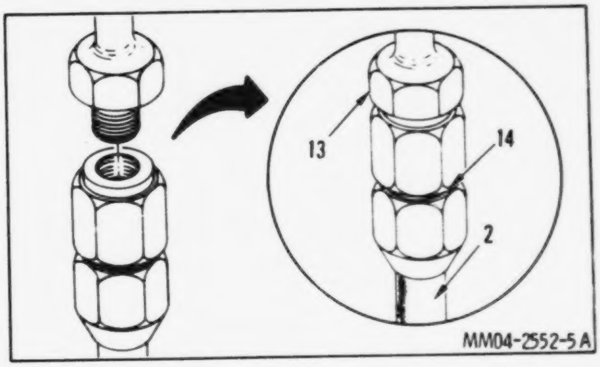
MM04-2552-9A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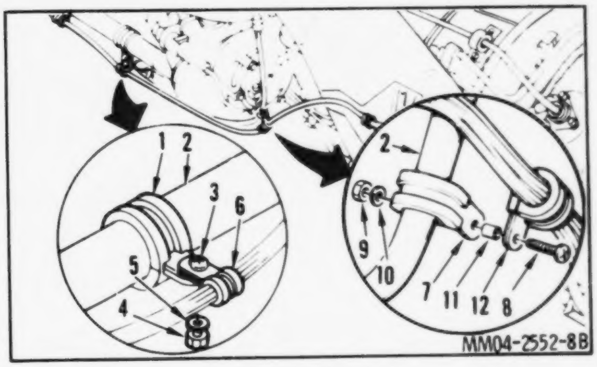
MM04-2552-5A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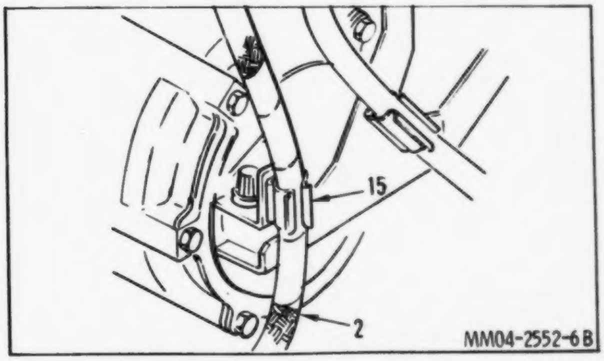
MM04-2552-8B


15
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MM04-2552-6B

END OF TASK

4-5-9. NO. 1 ENGINE DRAIN MANIFOLD REMOVAL/INSTALLATION 4-5-9

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, 1 & 1-1/8 Open-End	5120-00-187-7133
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Wrench, Torque, 3/8 Drive	5120-00-821-3441
Crowfoot Attachment, 9/16, 1/4 Drive	5120-00-541-4074
Crowfoot Attachment, 7/8, 3/8 Drive	5120-00-541-4071
Crowfoot Attachment, 1-inch, 3/8 Drive	5120-00-229-2772

Materials/Parts:

	Packing (2)
(E16)	Petrolatum

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

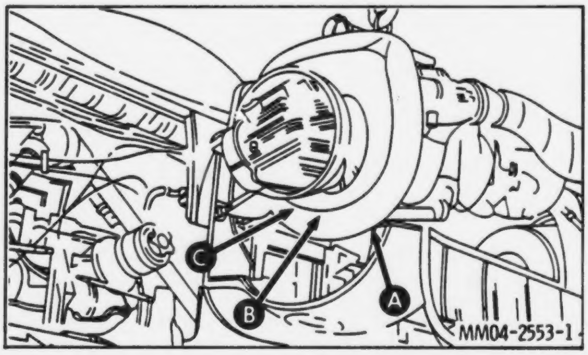
Ref	Condition
1-7-2	Helicopter safed

A. REMOVAL

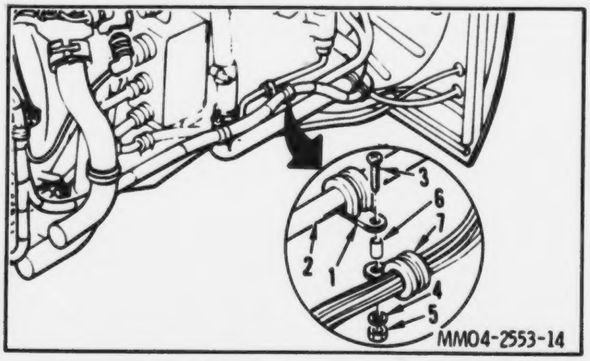
NOTE

Do not install removed engine in handling adapter.

1. **Remove No. 1 engine from nacelle** (para 4-2-3).



2. **Remove wire harness support clamp (1) from drain manifold (2).**
   a. Hold screw (3). Remove washer (4) and nut (5).
   b. Remove screw (3) from clamp (1), spacer (6) and clamp (7).



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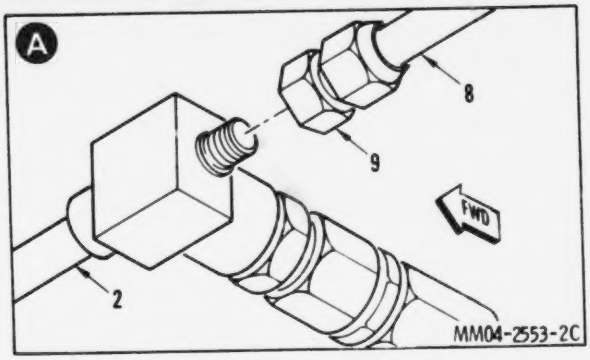
4-5-9. NO. 1 ENGINE DRAIN MANIFOLD REMOVAL/INSTALLATION (cont) 4-5-9

3. **Disconnect pressure and overspeed unit drain hose (8) from drain manifold (2).** Remove hose nut (9).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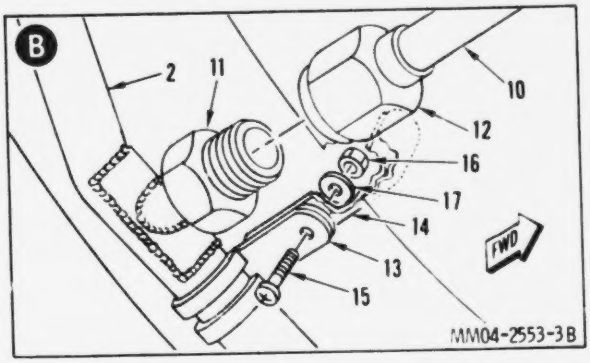
MM04-2553-2C

4. **Disconnect swirl frame drain tube (10) from manifold (2).**

   a. Hold adapter (11).

   b. Remove tube nut (12).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MM04-2553-3B

5. **Remove clamp (13) from engine clip (14).**

   a. Hold screw (15).

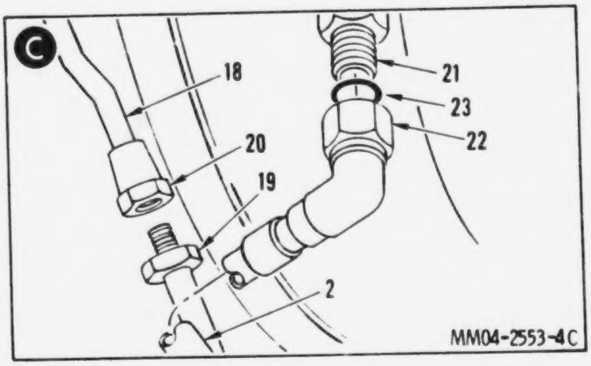
   b. Remove nut (16) and washer (17).

   c. Remove screw (15) and clamp (13).

6. **Disconnect hydromechanical unit (HMU) drain hose (18) from manifold (2).**

   a. Hold adapter (19).

   b. Remove hose nut (20).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MM04-2553-4C

7. **Disconnect manifold (2) from common drain union (21).**

   a. Hold union (21). Use 1-inch open-end wrench.

   b. Remove nut (22) and packing (23).

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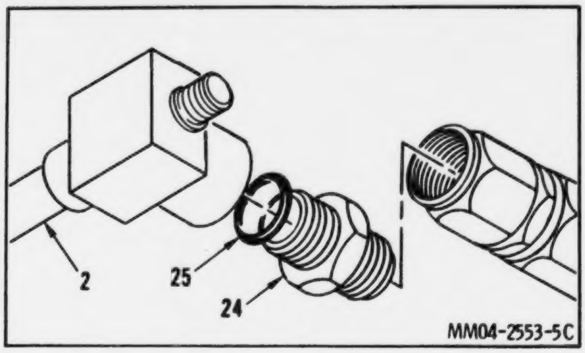
4-5-9. NO. 1 ENGINE DRAIN MANIFOLD REMOVAL/INSTALLATION (cont) 4-5-9



8. **Remove outlet union (24) from manifold (2).**

   a. Hold manifold (2).

   b. Remove union (24). Use 1-inch open-end wrench.

   c. Remove and discard packing (25).

B. **CLEANING**

Clean hose nuts, tube nut, common drain union, and outlet union (para 1-5-36).

C. **INSPECTION**

1. **Check hose nuts and, tube nut, common drain union and outlet union for damaged threads.** None allowed.

2. **Check engine clip for cracks.** None allowed.

3. **Check hose nuts, tube nut, common drain union, outlet union, and engine clip for corrosion** (para 1-5-38).

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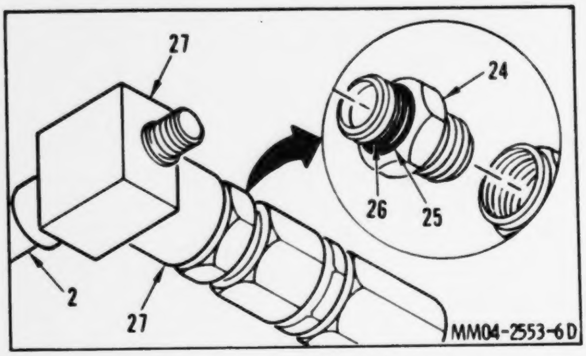
4-5-9. NO. 1 ENGINE DRAIN MANIFOLD REMOVAL/INSTALLATION (cont) 4-5-9

D. INSTALLATION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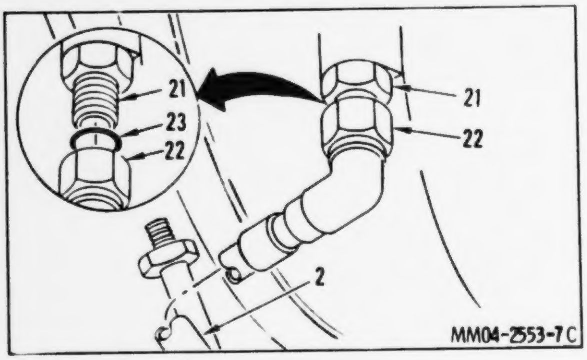
MM04-2553-6D

1. **Install new packing (25) on outlet union (24).**

   a. Lubricate new packing (25). Use petrolatum (E16).

   b. Install packing (25) in union groove (26).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MM04-2553-7C

2. **Install outlet union (24) in manifold (2).** Torque union (24) to **300 INCH-POUNDS.**

   a. Install union (24) in adapter (27).

   b. Hold adapter (27).

   c. Torque union (24) to **300 INCH-POUNDS.** Use 3/8 drive torque wrench and 1-inch crowfoot.

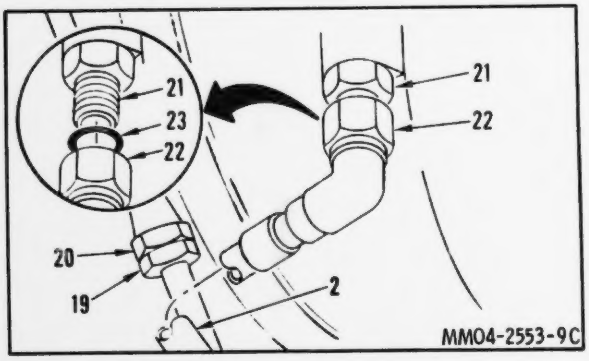
3. **Connect manifold (2) to common drain union (24).**

   a. Install packing (23) on union (21).

   b. Install nut (22) on union (21).

CAUTION

Do not twist hoses. Twisted hoses may collapse or crack when connected.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MM04-2553-9C

4. **Connect HMU drain hose (19) to manifold (2).** Install nut (20) on adapter (19).

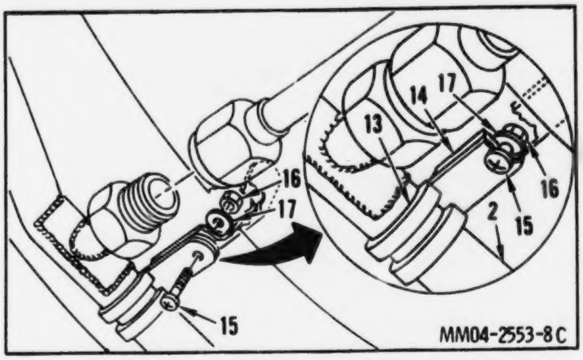
   a. Hold adapter (19).

   b. Install hose nut (20).

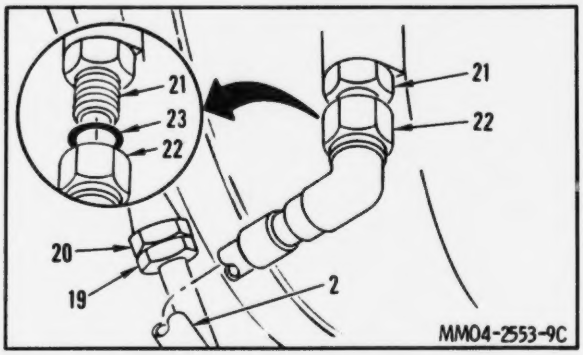
GO TO NEXT PAGE

4-5-9. NO. 1 ENGINE DRAIN MANIFOLD REMOVAL/INSTALLATION (cont) 4-5-9

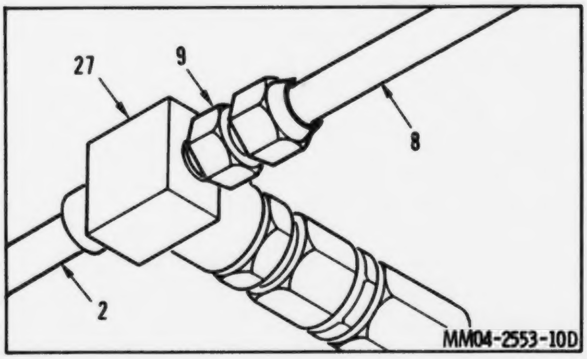
5. **Install clamp (13) on manifold (2) and engine clip (14).**
    - a. Fit loop of clamp (13) on manifold (2).
    - b. Insert screw (15) through clamp (13) and clip (14).
    - c. Install washer (17) and nut (16) on screw (15).



6. **Connect pressure and overspeed unit drain hose (8) to manifold (2).** Install nut (9) on manifold (2).
7. **Connect swirl frame drain tube (10) to manifold (2).** Install nut (12) on adapter (11).



8. **Torque manifold nut (22) to 290 INCH-POUNDS.**
    - a. Hold union (21). Use 1-inch open-end wrench.
    - b. Torque nut (22) to **290 INCH-POUNDS.** Use 3/8 drive torque wrench and 7/8 crowfoot.
9. **Torque hose nut (20) to 50 INCH-POUNDS.** Use 1/4 drive torque wrench and 9/16 crowfoot. Hold adapter (19).
10. **Torque hose nut (9) to 85 INCH-POUNDS.** Use 1/4 drive torque wrench and 9/16 crowfoot. Hold adapter (27).



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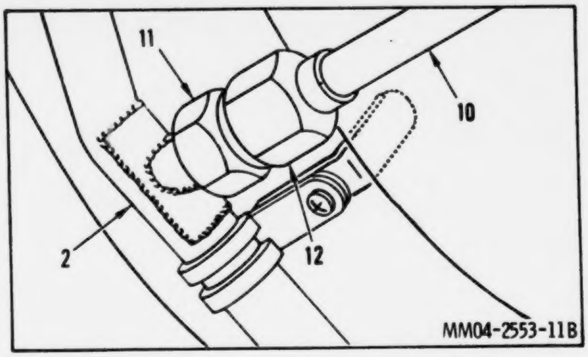
4-5-9. NO. 1 ENGINE DRAIN MANIFOLD REMOVAL/INSTALLATION (cont) 4-5-9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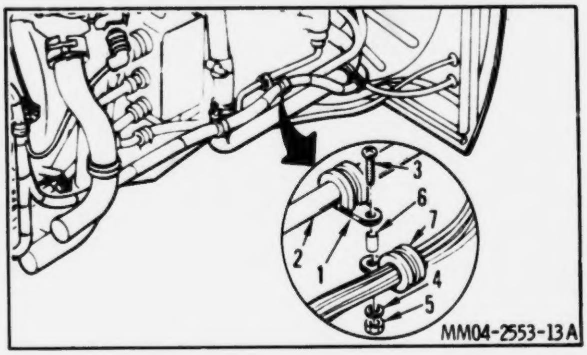
MM04-2553-11B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MM04-2553-13A

11. **Torque hose nut (12) to 120 INCH-POUNDS.** Use 1/4 drive torque wrench. Hold adapter (11).

12. **Install wire harness support clamp (1) on drain manifold (2).**

    a. Insert screw (3) through clamp (1), spacer (6), and clamp (7).

    b. Install washer (4) and nut (5).

13. **Inspect (TI).**

14. **Install No. 1 engine** (para 4-2-3).

END OF TASK

4-5-10. NO. 2 ENGINE DRAIN MANIFOLD REMOVAL/INSTALLATION 4-5-10

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, 1 & 1-1/8 Open-End	5120-00-187-7133
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Wrench, Torque, 3/8 Drive	5120-00-821-3441
Crowfoot Attachment 9/16, 1/4 Drive	5120-00-541-4074
Crowfoot Attachment 7/8, 3/8 Drive	5120-00-541-4071
Crowfoot Attachment 1-inch, 3/8 Drive	5120-00-229-2772

Materials/Parts:

	Packing
(E16)	Petrolatum

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

A. REMOVAL

NOTE

Do not install removed engine in handling adapter.

1. **Remove No. 2 engine from nacelle** (para 4-2-8).

2. **Disconnect nacelle drain hose (1) from No. 2 engine drain manifold (2).**

   a. Hold outlet union (3).

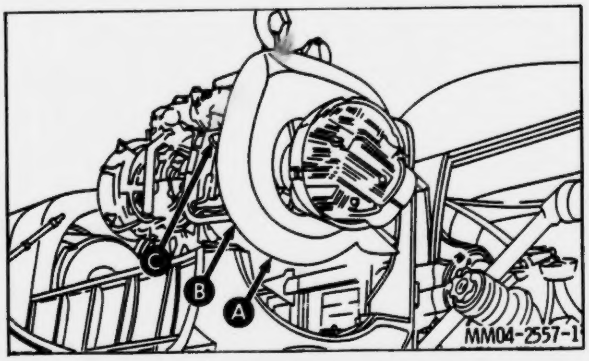
   b. Remove hose nut (4). Use 1-inch open end wrench.

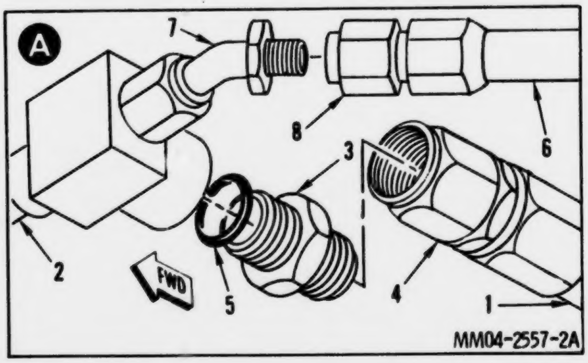
3. **Remove union (3) from manifold(2).** Remove and discard packing (5) from union (3).

4. **Disconnect pressure and overspeed unit (POU) drain hose (6) from drain manifold (2).**

   a. Hold adapter (7).

   b. Remove hose nut (8).





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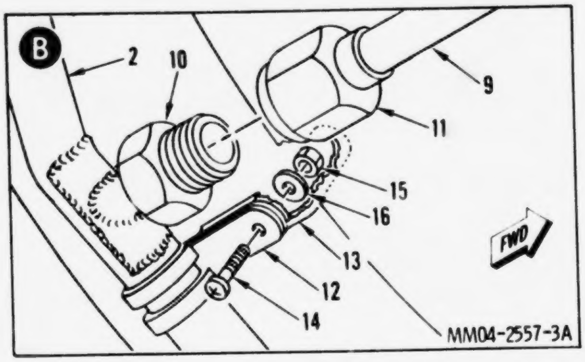
5. **Disconnect swirl frame drain tube (9) from manifold (2).**
   - a. Hold adapter (10).
   - b. Remove tube nut (11).
6. **Remove clamp (12) from engine clip (13) and manifold (2).**
   - a. Hold screw (14).
   - b. Remove nut (15) and washer (16).
   - c. Remove clamp (12) from manifold (2) and clip (18).
7. **Disconnect manifold (2) from common drain union (17).**
   - a. Hold union (17). Use 1-inch open-end wrench.
   - b. Remove nut (18).
8. **Disconnect hydromechanical unit (HMU) drain hose (19) from manifold (2).**
   - a. Hold adapter (20).
   - b. Remove hose nut (21).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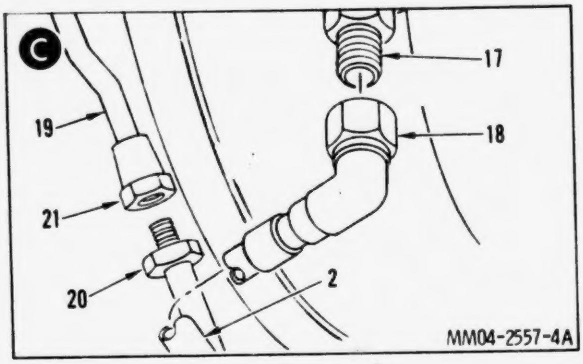
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B. CLEANING

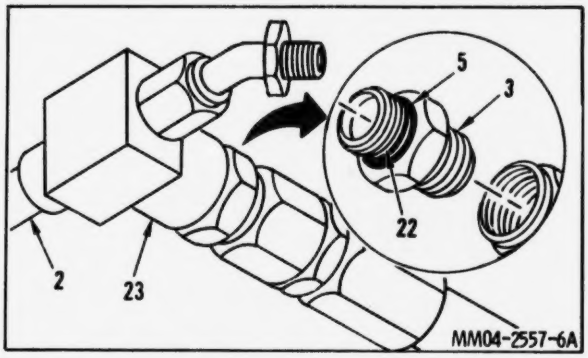
Clean hose nuts, tube nut, outlet union, and common drain union (para 1-5-36).

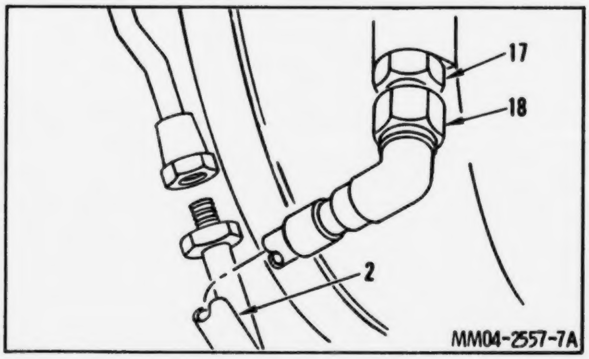
C. INSPECTION

1. **Check hose nuts, tube nut, outlet union, and common drain union for damaged threads.** None allowed.
2. **Check engine clip for cracks.** None allowed.
3. **Check hose nuts, tube nut, and outlet union, common drain union, and engine clip for corrosion** (para 1-5-38).

D. INSTALLATION

1. **Install new packing (5) on outlet union (3).**
   - a. Lubricate new packing (5). Use petrolatum (E16).
   - b. Install packing (5) in union groove (22).
2. **Install outlet union (3) in engine drain manifold (2).** Torque union (3) to **300 INCH-POUNDS.**
   - a. Install union (3) in adapter (23).
   - b. Hold adapter (23).
   - c. Torque union (3) to **300 INCH-POUNDS.** Use 3/8 drive torque wrench and 1-inch crowfoot.
3. **Connect manifold (2) to common drain union (17).** Hand-tighten nut (18).





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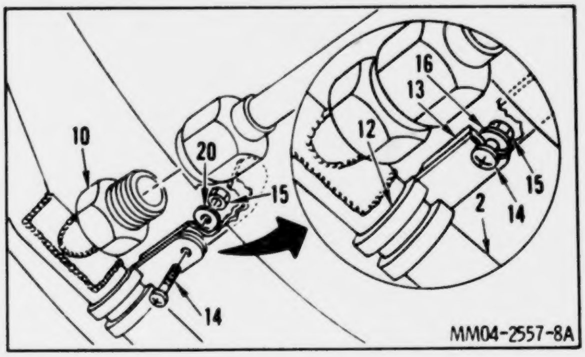
4-5-10. NO. 2 ENGINE DRAIN MANIFOLD REMOVAL/INSTALLATION (cont) 4-5-10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4. **Install clamp (12) on manifold (2) and engine clip (13).**

   a. Fit loop of clamp (12) on manifold (2) between adapters (23) and (10).

   b. Insert screw (14) through clamp (12) and clip (13).

   c. Install washer (16) and nut (15) on screw (14).

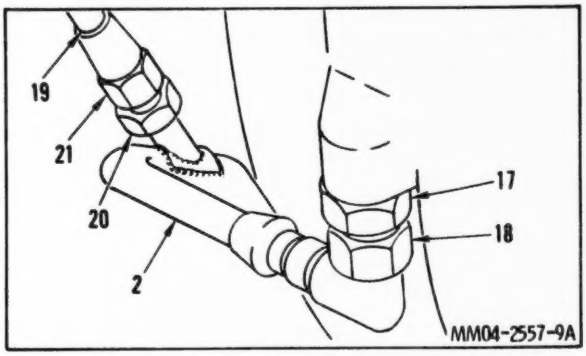
GO TO NEXT PAGE

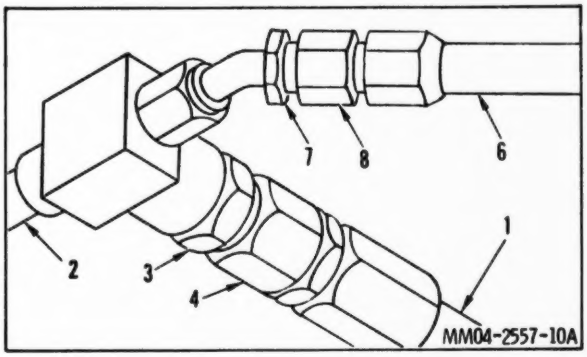
4-5-10. NO. 2 ENGINE DRAIN MANIFOLD REMOVAL/INSTALLATION (cont) 4-5-10

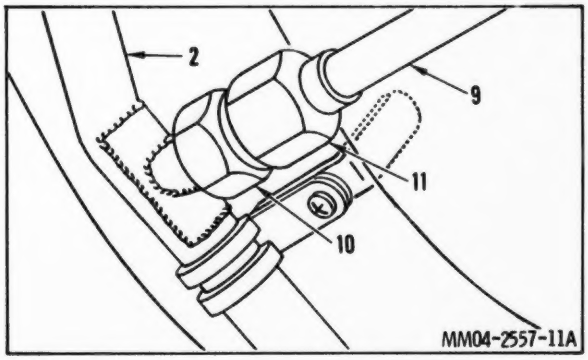
CAUTION

Do not twist hoses. Twisted hoses may collapse or crack when connected.

5. **Connect HMU drain hose (19) to manifold (2).** Install nut (21) on adapter (20).
6. **Connect POU drain hose (6) to manifold (2).** Install nut (8) on adapter (7).
7. **Connect swirl frame drain tube (9) to manifold (2).** Install nut (11) on adapter (10).
8. **Connect nacelle drain hose (1) to manifold (2).** Install hose nut (4) on outlet union (3).
9. **Torque manifold nut (18) to 290 INCH-POUNDS.**
   - a. Hold union (17). Use 1-inch open-end wrench.
   - b. Torque nut (18) to **290 INCH-POUNDS.** Use 3/8 drive torque wrench and 7/8 crowfoot.
10. **Torque hose nut (21) to 50 INCH-POUNDS.** Use 1/4 drive torque wrench and 9/16 crowfoot. Hold adapter (20).
11. **Torque hose nut (8) to 85 INCH-POUNDS.** Use 1/4 drive torque wrench and 9/17 crowfoot. Hold adapter (7).
12. **Torque tube nut (11) to 120 INCH-POUNDS.** Use 1/4 drive torque wrench. Hold adapter (10).
13. **Torque hose nut (4) to 85 INCH-POUNDS.** Hold union (3).
14. **Inspect (TI).**
15. **Install No. 2 engine in nacelle** (para 4-2-47).
16. **Secure engine work platform doors RN1 and RN3.** (para 2-2-2).







END OF TASK

4-5-11. NO. 1 AND NO. 2 ENGINE SWIRL FRAME DRAIN TUBE REMOVAL/INSTALLATION 4-5-11

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Equipment Conditions:

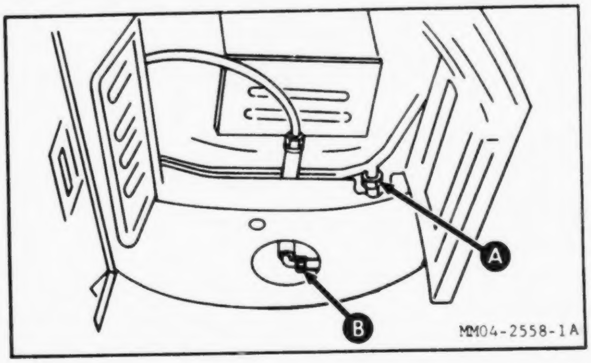
Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform doors LN2, LN3, and LN4 or RN2, RN3 and RN4 opened

Personnel Required:

67R10 Attack Helicopter Repairer
66R30 Inspector/Supervisor

NOTE

This task is typical for No. 1 or No. 2 engine swirl drain tube.

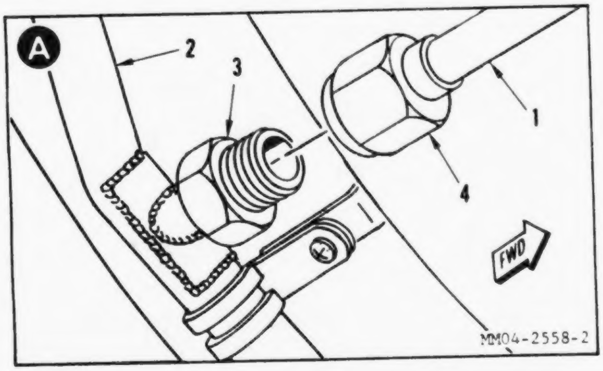


A. **REMOVAL**

1. **Disconnect No. 1 or No. 2 swirl frame drain tube (1) from manifold (2).**

   a. Hold adapter (3).

   b. Remove nut (4).



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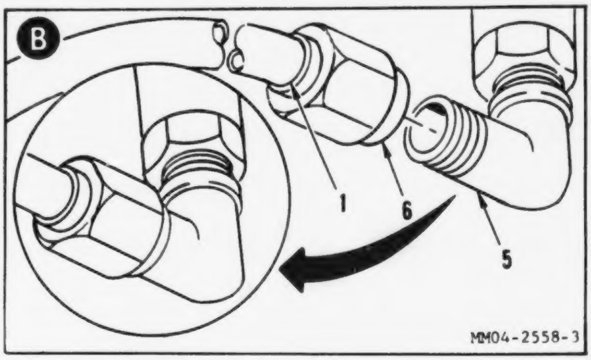
4-5-11. NO. 1 AND NO. 2 ENGINE SWIRL FRAME DRAIN TUBE REMOVAL/INSTALLATION (cont) 4-5-11



2. **Disconnect tube (1) from swirl frame elbow (5).**

   a. Hold elbow (5).

   b. Remove nut (6).

B. **CLEANING**

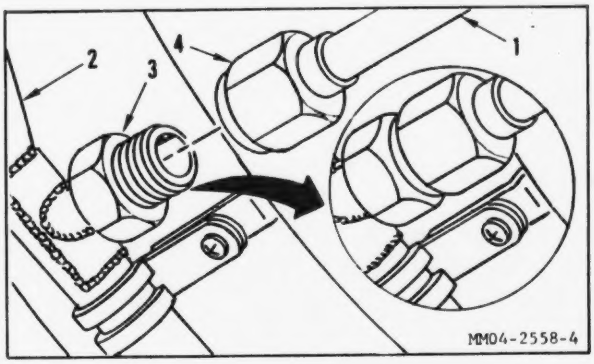
Clean adapter and elbow (para 1-5-36).

C. **INSPECTION**

1. **Check adapter for damaged threads or looseness.** None allowed.

2. **Check elbow for damaged threads.** None allowed.

3. **Check adapter and elbow for corrosion** (para 1-5-38).



D. **INSTALLATION**

1. **Connect tube (1) to elbow (5).** Hand-tighten nut (6) on elbow (5).

2. **Connect tube (1) to manifold (2).** Hand-tighten nut (4) on adapter (3).

3. **Hold elbow (5).** Torque nut (6) to **120 INCH-POUNDS.**

4. **Hold adapter (3).** Torque nut (4) to **120 INCH-POUNDS.**

5. **Inspect (TI).**

6. **Secure engine work platform doors LN2, LN3, and LN4 or RN2, RN3, and RN4** (para 2-2-2).

END OF TASK

4-5-12. NO. 1 AND NO. 2 ENGINE AFT INBOARD MOUNT REMOVAL/INSTALLATION 4-5-12

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 3/8 Drive	5120-00-288-8865

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

A. REMOVAL

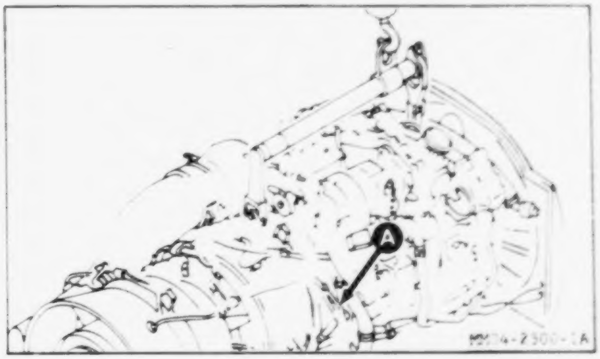
NOTE

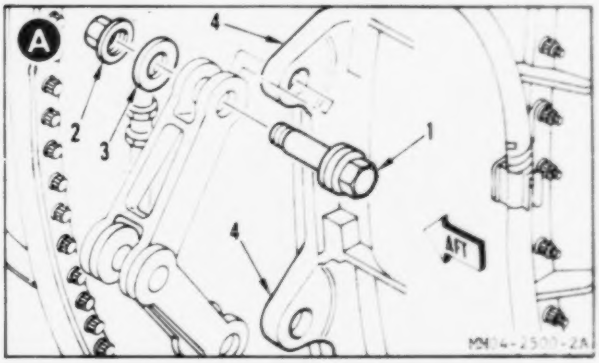
- This task is typical for No. 1 or No. 2 aft inboard mount.
- Do not install removed engine in handling adapter.

1. **Remove No. 1 engine from nacelle** (para 4-2-3) **or No. 2 engine from nacelle** (para 4-2-8).
2. **Hold two bolts (1).**
3. **Remove two nuts (2) and washers (3).**
4. **Remove two bolts (1).**

B. CLEANING

Clean diffuser case mounting lugs (para 1-5-36).





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4-5-12. NO. 1 AND NO. 2 ENGINE AFT INBOARD MOUNT REMOVAL/INSTALLATION (cont)

C. INSPECTION

1. **Check lugs for cracks.**
   None allowed.

2. **Check lugs for corrosion**
   (para 1-5-38).

D. INSTALLATION

1. **Aline mount links (5) on lugs (4).**

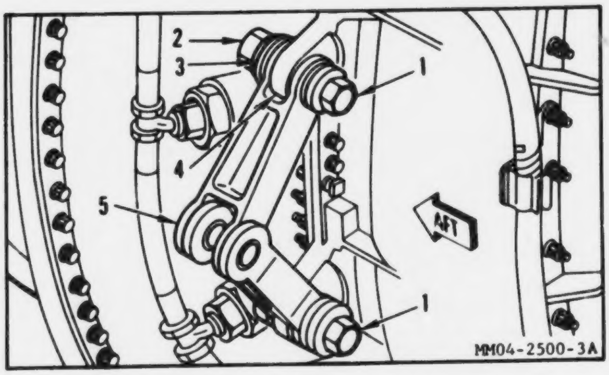
2. **Insert two bolts (1) through links (5) and lugs (4).**

3. **Install two washers (3) and nuts (2) on bolts (1).**

4. **Hold two bolts (1).**
   Torque two nuts (2) to
   175 INCH-POUNDS.

5. **Inspect (TI).**

6. **Install No. 1 engine** (para 4-2-43) **or No. 2 engine in nacelle** (para 4-2-47).



END OF TASK

4-5-13. NO. 1 AND NO. 2 ENGINE FORWARD INBOARD MOUNT REMOVAL/INSTALLATION 4-5-13

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 3/8 Drive	5120-00-288-8865

Materials/Parts:

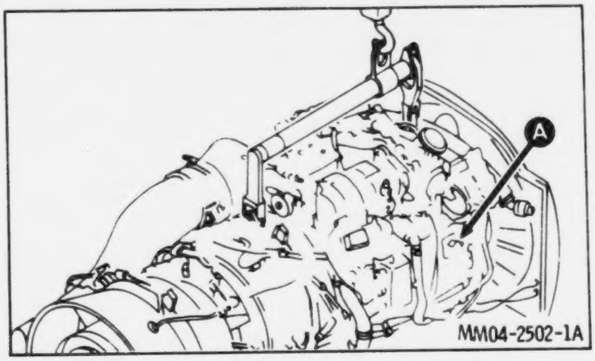
(E29) Lockwire

Personnel Required:

67R10 Attack Helicopter Repairer
66R30 Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



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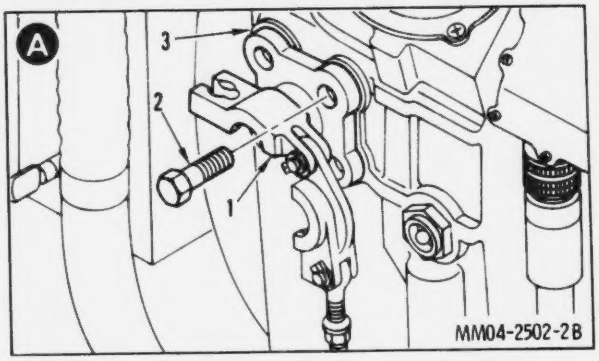

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A. REMOVAL

NOTE

- This task is typical for No. 1 or No. 2 engine forward inboard mount.
- Do not install removed engine in handling adapter.

1. **Remove No. 1 engine from nacelle** (para 4-2-3) **or No. 2 engine from nacelle** (para 4-2-8).
2. **Remove lockwire.**
3. **Remove mount (1).** Remove four bolts (2) from boss (3).

B. CLEANING

Clean main frame mounting boss (para 1-5-36).

C. INSPECTION

1. **Check boss for cracks.** None allowed.
2. **Check boss for corrosion** (para 1-5-38).

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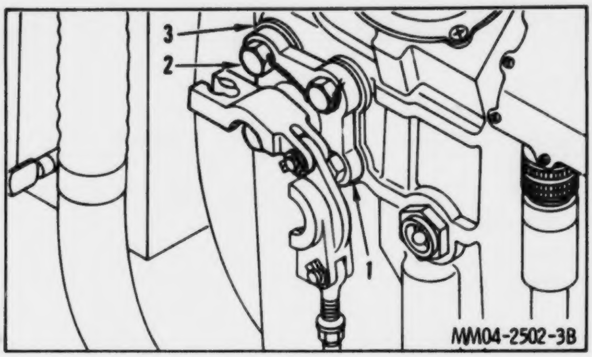
4-5-13. NO. 1 AND NO. 2 ENGINE FORWARD INBOARD MOUNT REMOVAL/INSTALLATION (cont) 4-5-13



D. INSTALLATION

1. Aline mount (1) on boss (3).
2. Install four bolts (2) through mount (1) and boss (3).
3. Torque four bolts (2) to 145 INCH-POUNDS.
4. Lockwire four bolts (2). Use lockwire (E29).
5. Inspect (TI).
6. Install No. 1 engine in nacelle (para 4-2-43) or No. 2 engine in nacelle (para 4-2-47).

END OF TASK

4-5-14. NO. 1 AND NO. 2 ENGINE FORWARD LOWER MOUNT REMOVAL/INSTALLATION 4-5-14

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 3/8 Drive	5120-00-288-8865

Materials/Parts:

(E29) Lockwire

Personnel Required:

67R10 Attack Helicopter Repairer
66R30 Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

A. REMOVAL

NOTE

This is typical for No. 1 or No. 2 engine forward lower mount.

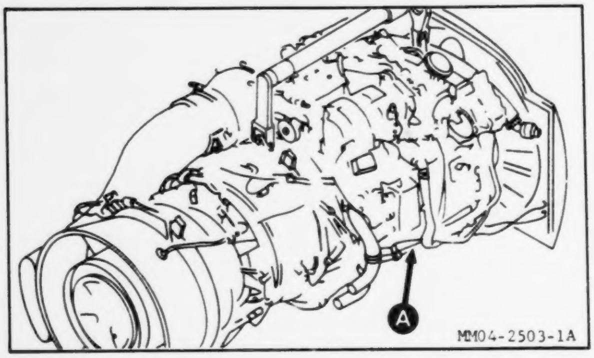
1. **Remove No. 1 engine (para 4-2-7) or No. 2 engine from nacelle (para 4-2-11).**
2. **Remove lockwire.**
3. **Remove mount (1). Remove four bolts (2) from boss (3).**

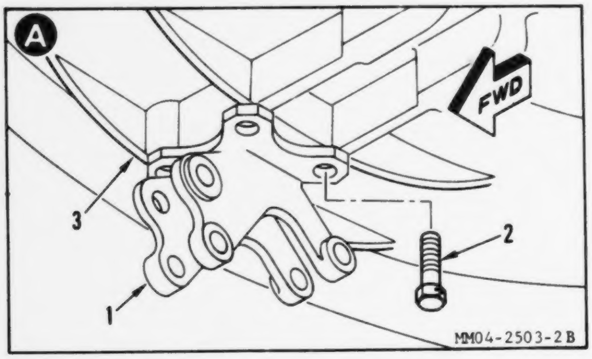
B. CLEANING

Clean main frame mounting boss (para 1-5-36).

C. INSPECTION

1. **Check boss for cracks.** None allowed.
2. **Check boss for corrosion** (para 1-5-38).





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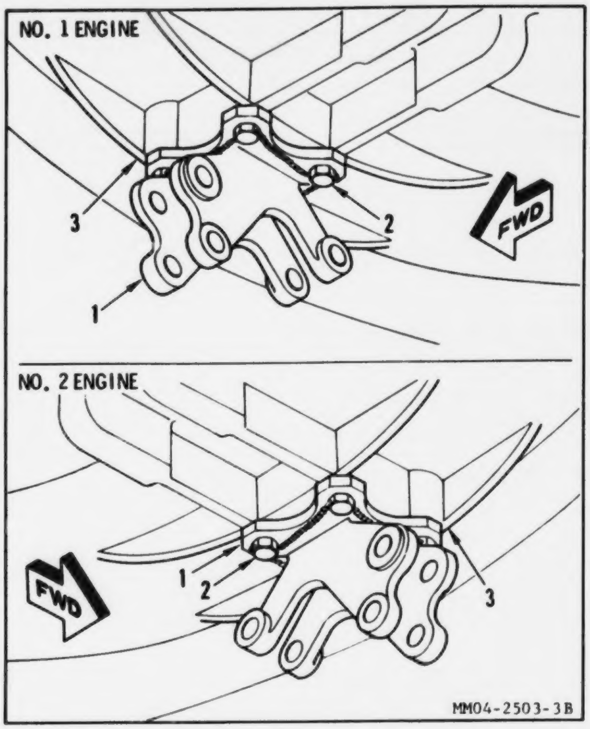
4-5-14. NO. 1 AND NO. 2 ENGINE FORWARD LOWER MOUNT REMOVAL/INSTALLATION (cont) 4-5-14

D. INSTALLATION

1. **Aline mount (1) on boss (3).**
2. **Install four bolts (2) through mount (1) and boss (3).**
3. **Torque four bolts (2) to 145 INCH-POUNDS.**
4. **Lockwire four bolts (2).** Use lockwire (E29).
5. **Inspect (TI).**
6. **Install No. 1 engine** (para 4-2-44) **or No. 2 engine in nacelle** (para 4-2-48).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END OF TASK

4-5-15. NO. 1 ENGINE FUEL PRESSURE SWITCH REPLACEMENT 4-5-15

This task covers: A. REMOVAL B. INSPECTION C. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Materials/Parts:

Packing
(E16) Petrolatum

Personnel Required:

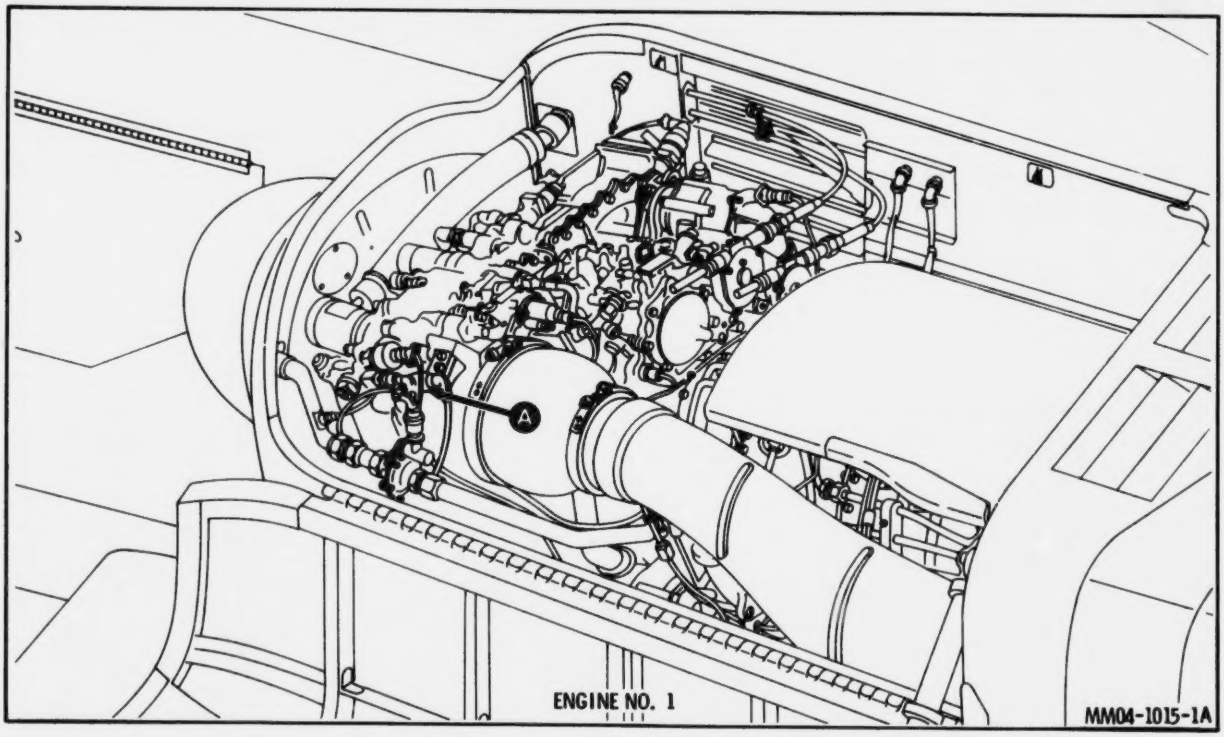
67R10 Attack Helicopter Repairer
66R30 Inspector/Supervisor

References:

TM 55-1520-238-T
TM 55-2840-248-23

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door LN1 opened



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4-5-15. NO. 1 ENGINE FUEL PRESSURE SWITCH REPLACEMENT (cont) 4-5-15

A. REMOVAL

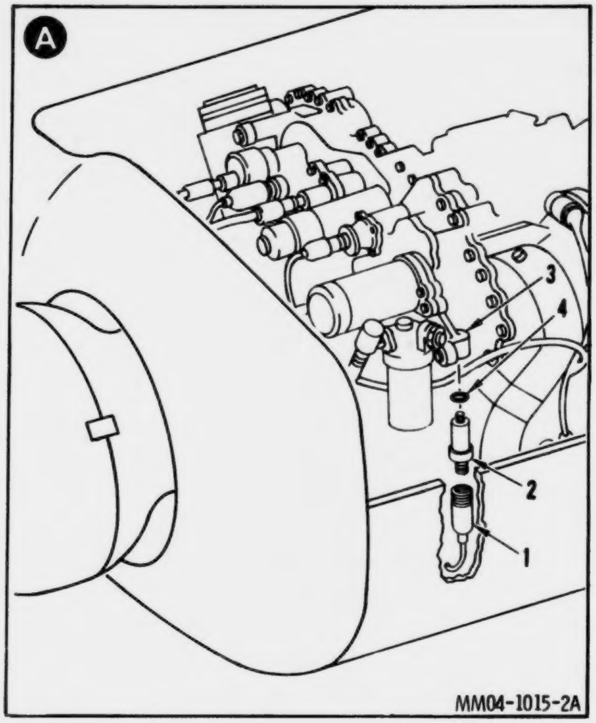
1. **Detach connector P45 (1) from pressure switch (2).**
2. **Remove pressure switch (2) from gearbox housing boss (3).**
3. **Remove and discard packing (4).**

B. INSPECTION

1. **Check gearbox housing boss for thread damage.** Damage not to exceed 50 percent of one thread.
2. **Check connector P45 for damage** (TM 55-2840-248-23).

C. INSTALLATION

1. **Install new packing (4) on pressure switch (2).** Lubricate packing (4) and threads of pressure switch (2). Use petrolatum (E16).
2. **Install pressure switch (2) in gearbox housing boss (3).**
3. **Attach connector P45 (1) to pressure switch (2).**
4. **Inspect (TI).**
5. **Perform power plants operational check (Engine 1)** (TM 55-1520-238-T).
6. **Secure engine work platform door LN1** (Para 2-2-2).



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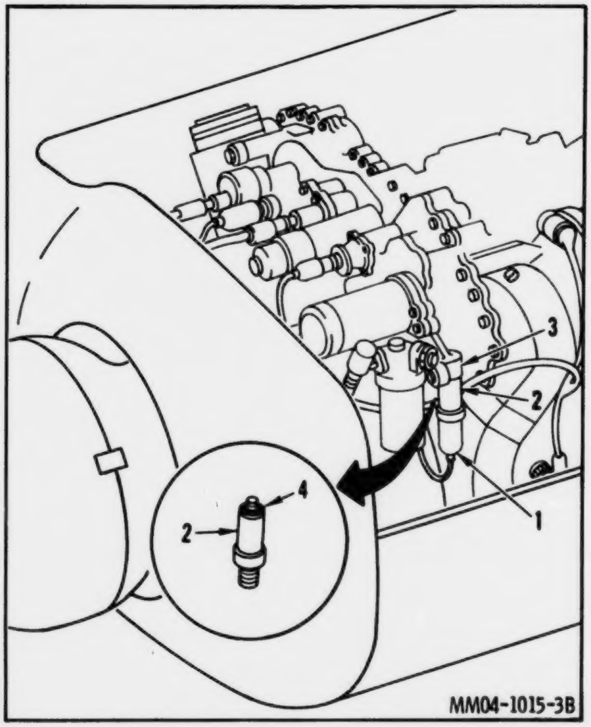

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END OF TASK

4-5-16. NO. 2 ENGINE FUEL PRESSURE SWITCH REPLACEMENT 4-5-16

This task covers: A. REMOVAL B. INSPECTION C. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

References:

TM 55-1520-238-T
TM 55-2840-248-23

Materials/Parts:

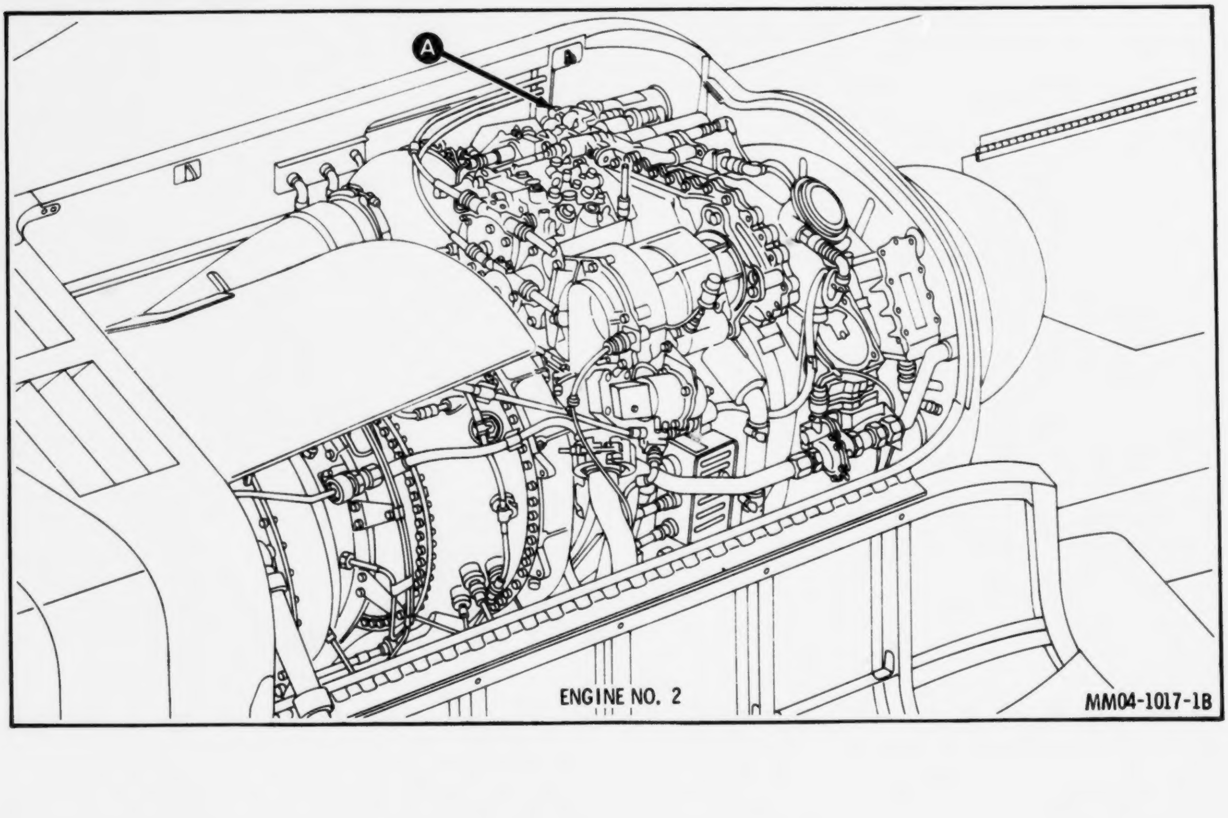
	Packing
(E16)	Petrolatum

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door LN1 opened.



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4-5-16. NO. 2 ENGINE FUEL PRESSURE SWITCH REPLACEMENT (cont) 4-5-16

A. REMOVAL

1. Detach connector P46 (1) from pressure switch (2).

2. Remove switch (2) from gearbox housing boss (3).

3. Remove and discard packing (4).

B. INSPECTION

1. Check gearbox housing boss for thread damage. Damage not to exceed 50 percent of one thread.

2. Check connector P46 for damage (TM 55-2840-248-23).

C. INSTALLATION

1. Install new packing on pressure switch (2). Lubricate packing (4) and threads of pressure switch (2). Use petrolatum (E16).

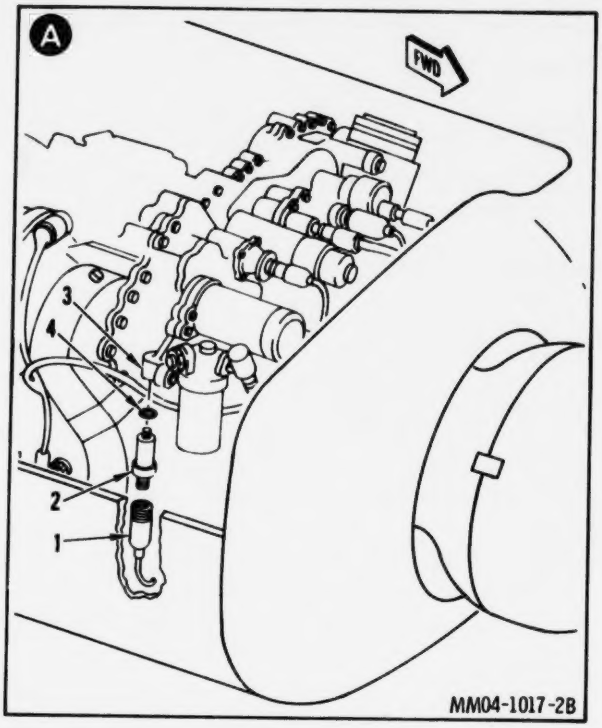
2. Install pressure switch (2) in housing boss (3).

3. Attach connector P46 (1) to switch (2).

4. Inspect (TI).

5. Perform No. 2 engine ground run powerplant operational check (TM 55-1520-238-T).

6. Secure engine work platform door RN2 (para 2-2-2).



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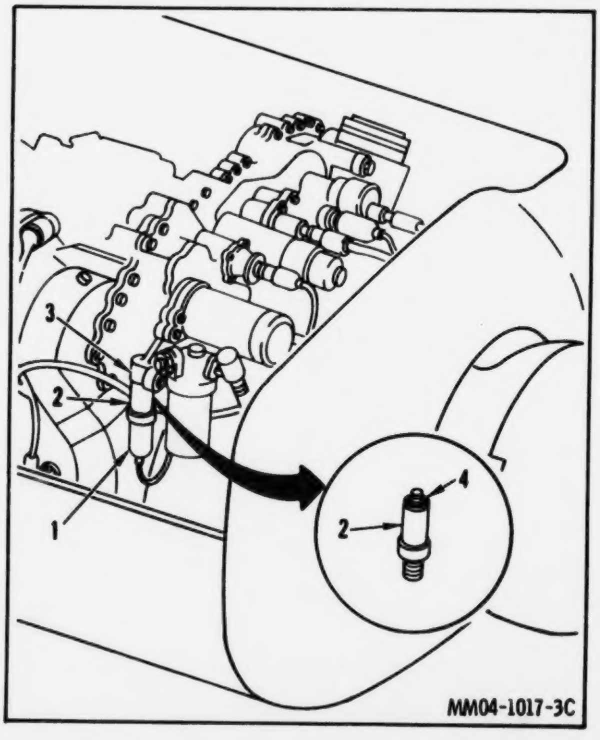


MM04-1017-3C

END OF TASK

Section VI. EXHAUST SYSTEM MAINTENANCE

4-6-1. NO. 1 AND NO. 2 ENGINE PRIMARY EXHAUST NOZZLE REMOVAL/INSTALLATION 4-6-1

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. REPAIR E. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Material/Parts:

(E1)	Solvent
(E125)	Pressure Sensitive Tape

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-2-3	No. 1 engine removed or
4-2-8	No. 2 engine removed

NOTE

This task is typical for No. 1 or No. 2 primary exhaust nozzle.

A. REMOVAL

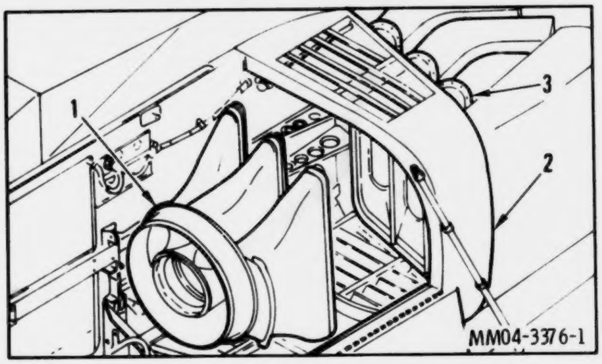
1. **Remove primary nozzle (1) from nacelle (2).**

   a. Move primary nozzle (1) forward until it clears secondary nozzle (3).

   b. Remove primary nozzle (1) from nacelle (2).

B. CLEANING

Clean primary nozzle and attaching parts (para 1-5-36).



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4-6-1. NO. 1 AND NO. 2 ENGINE PRIMARY EXHAUST NOZZLE REMOVAL/INSTALLATION (cont) 4-6-1

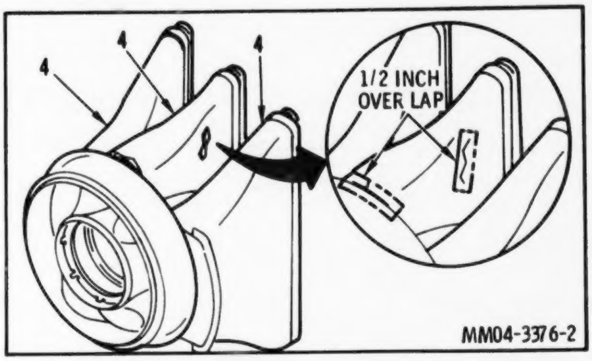
C. INSPECTION

1. **Check primary exhaust nozzle at spotwelded leading edges of insulated blankets. Check for spotweld failures which allow any aft rollback of blanket leading edge.**

   a. If roll-back is less than 4 inches, repair.

   b. If tears or holes are less than 2 inches, repair.

   c. If insulation blanket damage exceeds repair criteria, replace primary exhaust nozzle.



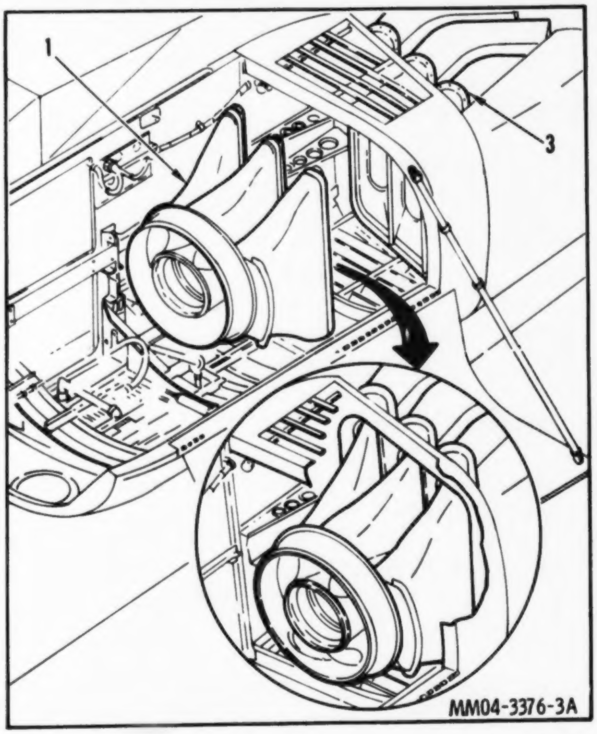
MM04-3376-2

D. REPAIR

Repair holes, tear, or roll-back on insulation blanket. Apply tape to overlap damaged area at least 1/2 inch. Use tape (E125).

E. INSTALLATION

1. **Install nozzle (1) on nozzle (3).** Move nozzle (1) aft to nozzle (3) until nozzle (1) alines with nozzle (3).
2. **Inspect (TI).**
3. **Install No. 1 engine (4-2-43) or No. 2 engine** (para 4-2-47).



MM04-3376-3A

END OF TASK

4-6-2. NO. 1 AND NO. 2 ENGINE OUTBOARD SECONDARY NOZZLE REMOVAL/INSTALLATION 4-6-2

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. REPAIR E. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Materials/Parts:

	Cotter Pin
(E43)	Oil

Personnel Required:

67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

NOTE

This task is typical for No. 1 or No. 2 engine outboard secondary nozzle.

A. REMOVAL

1. **Disconnect strut (1) from fairing (2).**

   a. Remove and discard cotter pin (3).

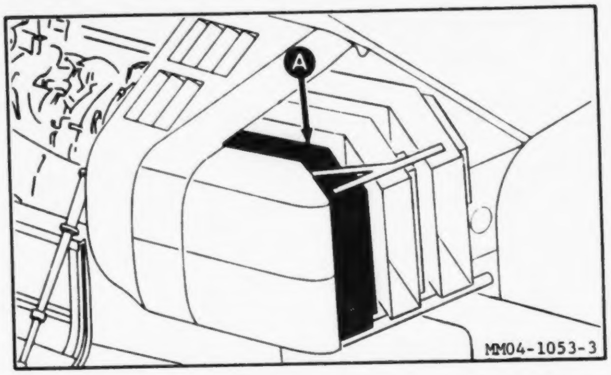
   b. Remove washer (4) and pin (5) from clevis (6) and lug (7).

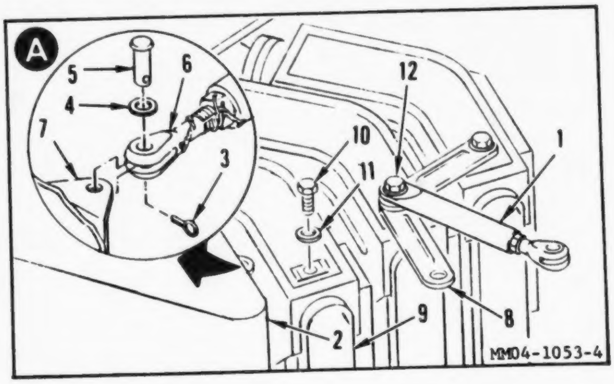
2. **Disconnect strut (8) from outboard secondary nozzle (9).** Remove bolt (10) and washer (11).

3. **Move struts (1) and (8) clear of nozzle (9).**

   a. Loosen bolt (12).

   b. Swing struts (1) and (8) aft to clear.





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4-6-2. NO. 1 AND NO. 2 ENGINE OUTBOARD SECONDARY NOZZLE REMOVAL/INSTALLATION (cont) 4-6-2

WARNING

Fuel deposits on nozzles may be toxic. Use care to prevent cuts from fins and flanges. If injury occurs, flush skin with water and seek medical aid.

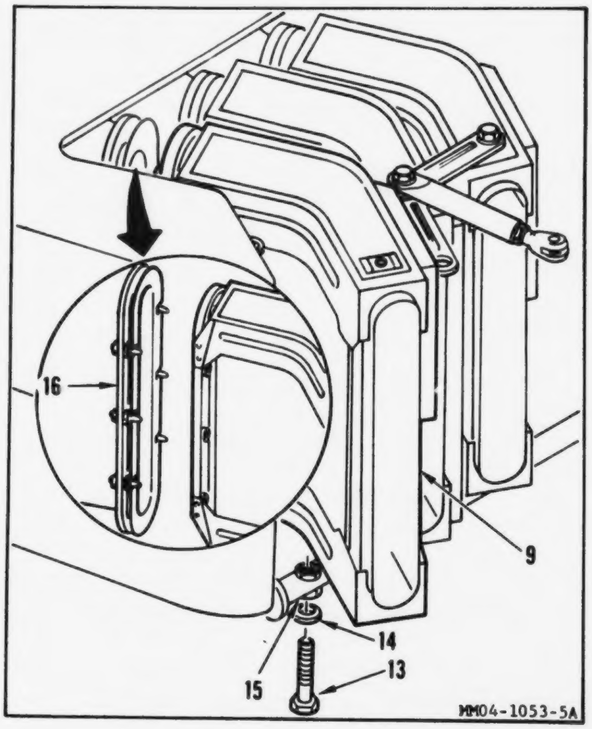
4. **Remove nozzle (9).**
   a. Remove bolt (13) and washer (14) from strut (15) and nozzle (9).
   b. Slide nozzle (9) aft from support (16) and strut (15).

B. **CLEANING**

Clean all removed parts and attaching parts or surfaces (para 1-5-36).

C. **INSPECTION**

1. **Check aft face of support for cracks; loose, bent, or missing pins; and torn or cracked seal.** None allowed.
2. **Check nozzle mounting area on strut for cracks, bending, and loose or missing spacers.** None allowed.
3. **Check support and strut for corrosion** (para 1-5-38).



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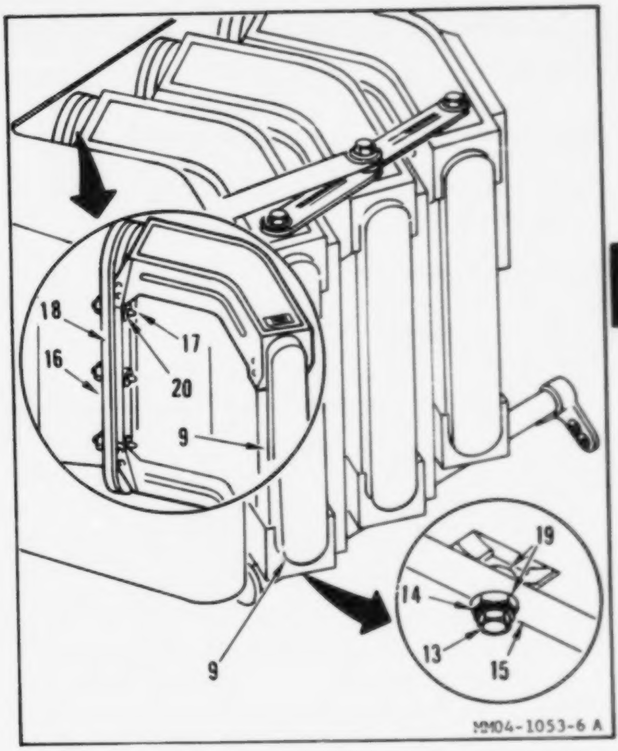
4-6-2. NO. 1 AND NO. 2 ENGINE OUTBOARD SECONDARY NOZZLE REMOVAL/INSTALLATION (cont) 4-6-2

D. REPAIR

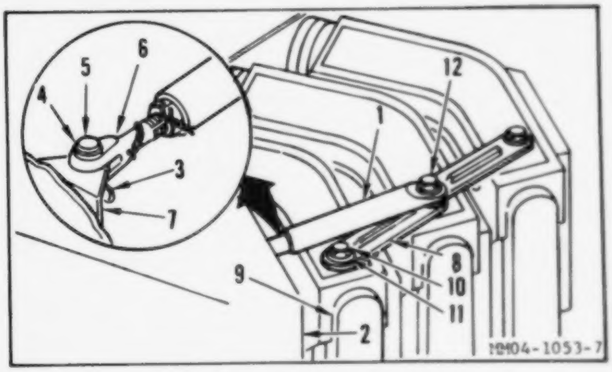
Repair pin damage on support (16) by replacing damaged pins (17) (para 4-6-14).

E. INSTALLATION

1. Lubricate six pins (17). Use oil (E43)
2. Aline nozzle (9) on strut (15) and support (16).
   a. Lift nozzle (9) onto strut (15).
   b. Aline six bushing holes (20) just aft of pins (17).
   c. Slide nozzle (9) forward until seated on seal (18).
3. Install bolt (13) and washer (14).



4. Connect strut (8) to nozzle (9).
   a. Swing strut (8) forward over nozzle (9).
   b. Install bolt (10) and washer (11).
5. Connect strut (1) to fairing (2).
   a. Swing strut (1) forward over lug (7).
   b. Insert pin (5) with washer (4) through clevis (6) and lug (7).
   c. Install new cotter pin (3).
6. Tighten bolt (12).
7. Inspect (TI).



END OF TASK

4-6-3. NO. 1 AND NO. 2 ENGINE INBOARD SECONDARY NOZZLE REMOVAL/INSTALLATION 4-6-3

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. REPAIR E. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Materials/Parts:

(E29)	Lockwire
(E43)	Oil

Personnel Required:

67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

NOTE

This task is typical for No. 1 or No 2 inboard secondary nozzle.

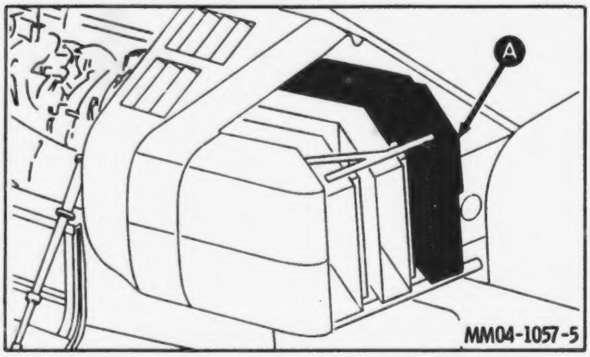
A. **REMOVAL**

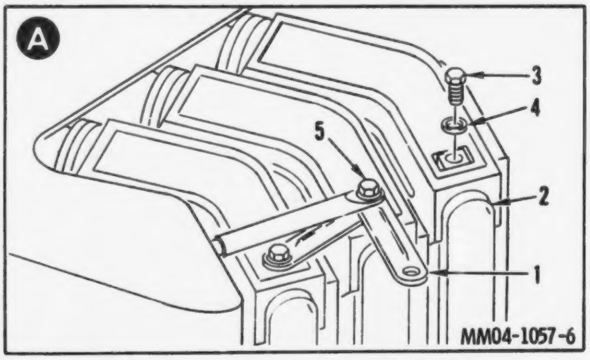
1. **Disconnect strut (1) from inboard secondary nozzle (2).** Remove bolt (3) and washer (4).

2. **Move strut (1) clear or nozzle (2).**

   a. Loosen bolt (5).

   b. Swing strut (1) aft to clear.





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4-6-3. NO. 1 AND NO. 2 ENGINE INBOARD SECONDARY NOZZLE REMOVAL/INSTALLATION (cont)

WARNING

Fuel deposits on nozzles may be toxic. Use care to prevent cuts from fins and flanges. If injury occurs, flush skin with water and seek medical aid.

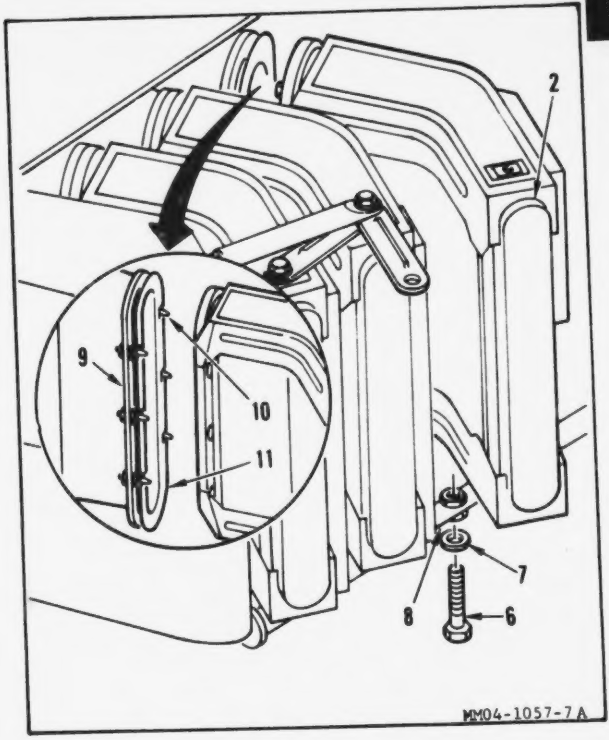
3. **Remove nozzle (2).**
   a. Remove lockwire from bolt (6).
   b. Remove bolt (6) and washer (7) strut (8) and nozzle (2).
   c. Slide nozzle (2) aft from support (9) and strut (8) until clear of pins (10).
   d. Lift nozzle (2) straight up to remove.
4. **Remove seal (11) from support (9).**

B. CLEANING

Clean all removed and attaching parts (para 1-5-36).

C. INSPECTION

1. **Check aft face of support for cracks; loose, bent, or missing pins; and torn or cracked seal.** None allowed.
2. **Check nozzle mounting area on strut for cracks, bending, and loose or missing spacers.** None allowed.
3. **Check support and strut for corrosion** (para 1-5-38).



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4-6-3. NO. 1 AND NO. 2 ENGINE INBOARD SECONDARY NOZZLE REMOVAL/INSTALLATION (cont) 4-6-3

D. REPAIR

1. Repair bushing damage on strut (8) by replacing damaged spacers (12) (para 4-6-5).

2. Repair support (9) by replacing damaged pins (10) (para 4-6-14).

E. INSTALLATION

1. Install seal (11) on support (9).

2. Lubricate six pins (10). Use oil (E43).

3. Aline nozzle (2) on strut (8) and support (9).

   a. Lower nozzle (2) straight down, clear of pins (10), and onto strut (8).

   b. Aline six bushing holes (13) just aft of pins (10).

   c. Slide nozzle (2) forward until seated on seal (11).

4. Install bolt (6) and washer (7).

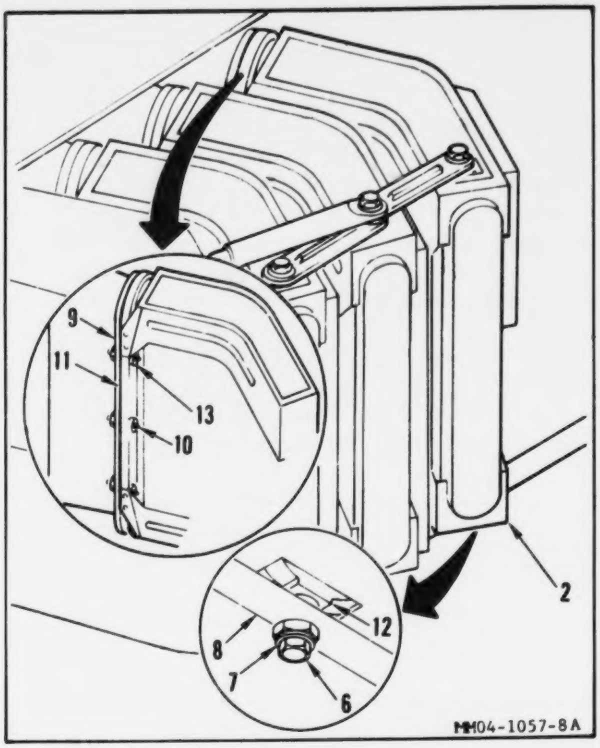
5. Lockwire bolt (6) to spacer (12) and strut (8). Use lockwire (E29).

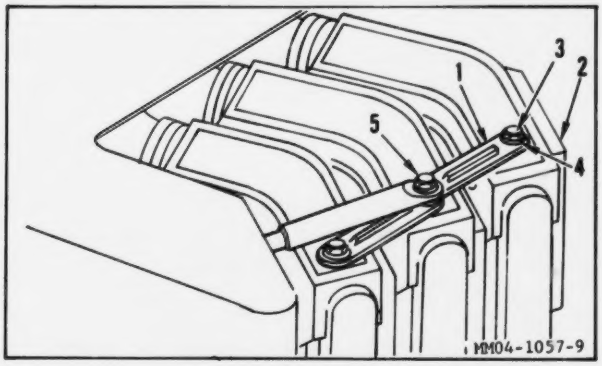
6. Connect strut (1) to nozzle (2).

   a. Swing strut (1) forward over nozzle (2).

   b. Install bolt (3) and washer (4).

7. Inspect (TI).





END OF TASK

4-6-4. NO. 1 AND NO. 2 ENGINE CENTER SECONDARY NOZZLE REMOVAL/INSTALLATION 4-6-4

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. REPAIR E. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Materials/Parts:

(E29)	Lockwire
(E43)	Oil

Personnel Required:

67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-6-2	No. 1 or No. 2 engine outboard secondary nozzle removed

NOTE

This task is typical for No. 1 or No. 2 center secondary nozzle.

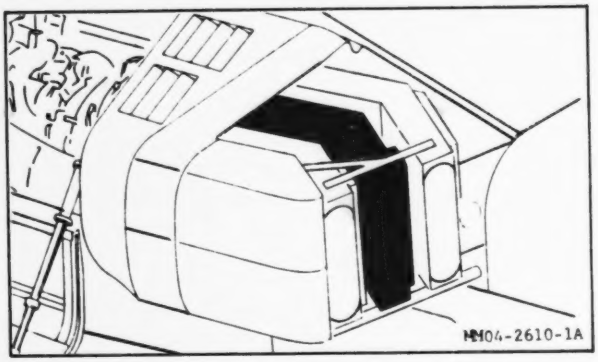
A. REMOVAL

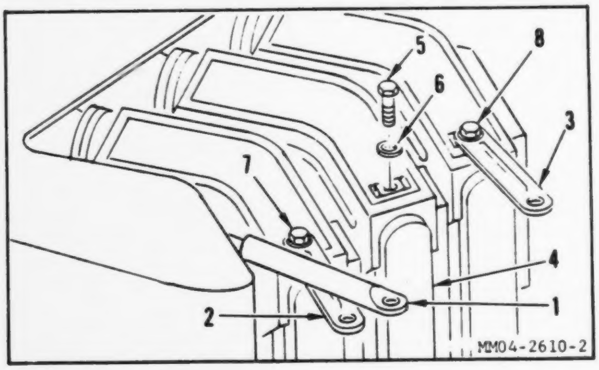
1. **Disconnect struts (1), (2), and (3) from engine center secondary nozzle (4).** Remove bolt (5) and washer (6).

2. **Move struts (1), (2), and (3) clear of nozzle (4).**

   a. Loosen bolts (7) and (8).

   b. Swing struts (1), (2), and (3) aft to clear.





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4-6-4. NO. 1 AND NO. 2 ENGINE CENTER SECONDARY NOZZLE REMOVAL/INSTALLATION (cont) 4-6-4

WARNING

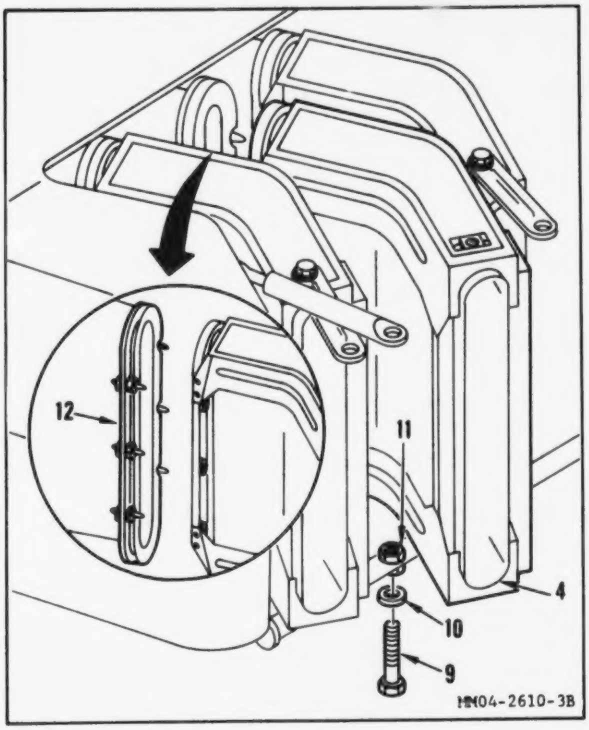
Fuel deposits on nozzles may be toxic. Use care to prevent cuts from fins and flanges. If injury occurs, flush skin with water and seek medical aid.

3. **Remove nozzle (4).**

   a. Remove lockwire from bolt (9).

   b. Remove bolt (9) and washer (10) from strut (11) and nozzle (4).

   c. Slide nozzle (4) aft from support (12) and strut (11).



B. **CLEANING**

Clean all removed parts and attaching parts or surfaces (para 1-5-36).

C. **INSPECTION**

1. **Check aft face of support for cracks; loose, bent, or missing pins; and torn or cracked seal.** None allowed.

2. **Check nozzle mounting area on strut for cracks, bending, and loose or missing spacers.** None allowed.

3. **Check support and strut for corrosion** (para 1-5-38).

GO TO NEXT PAGE

4-6-4. NO. 1 AND NO. 2 ENGINE CENTER SECONDARY NOZZLE REMOVAL/INSTALLATION (cont)

D. REPAIR

1. Repair bushing damage on strut (11) by replacing damaged spacers (15).

2. Repair pin damage on support (12) by replacing damaged pins (13).

3. Repair seal damage on support (12) by replacing seal (14).

E. INSTALLATION

1. Lubricate six pins (13). Use oil (E43).

2. Aline nozzle (4) on strut (11) and support (12).

   a. Lift nozzle (4) onto strut (11).

   b. Aline six spacer holes (16) just aft of pins (13).

   c. Slide nozzle (4) forward until seated on seal (14).

3. Install bolt (9) and washer (10) on strut (11).

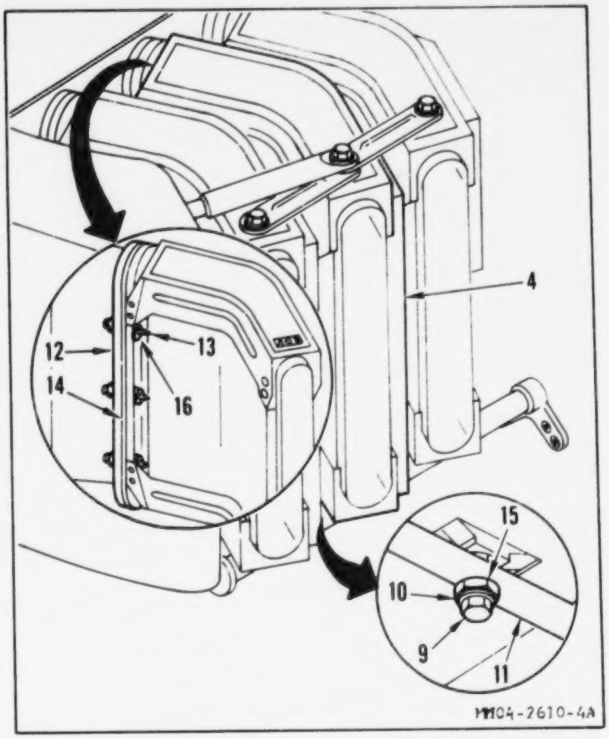
4. Connect struts (1), (2), and (3) to nozzle (4).

   a. Swing struts (1), (2), and (3) forward over nozzle (4).

   b. Install bolt (5) and washer (6).

5. Lockwire bolt (9) to spacer (15) and strut (11). Use lockwire (E29).

6. Inspect (TI).



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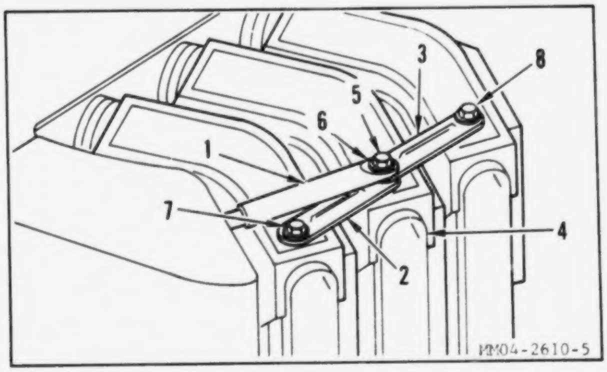


MM04-2610-5

END OF TASK

4-6-5. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE STRUCTURAL SUPPORT REMOVAL/INSTALLATION 4-6-5

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Materials/Parts:

(E29) Lockwire

Personnel Required:

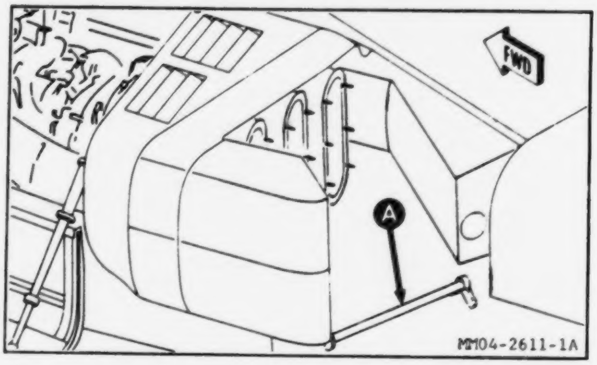
67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-6-2	No. 1 or No. 2 engine outboard secondary nozzle removed
4-6-3	No. 1 or No. 2 engine inboard secondary nozzle removed
4-6-4	No. 1 or No. 2 engine center secondary nozzle removed

NOTE

This task is typical for No. 1 or No. 2 secondary nozzle structural support.



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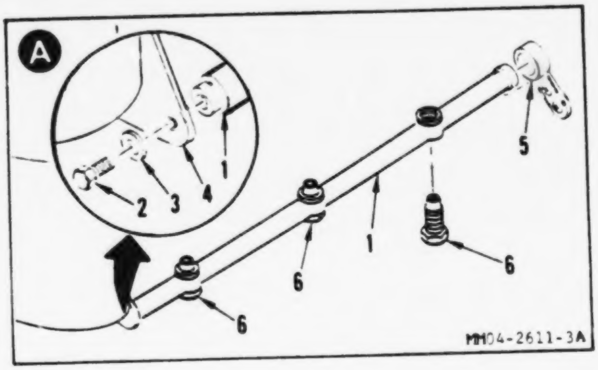
4-6-5. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE STRUCTURAL SUPPORT REMOVAL/INSTALLATION (cont) 4-6-5



A. REMOVAL

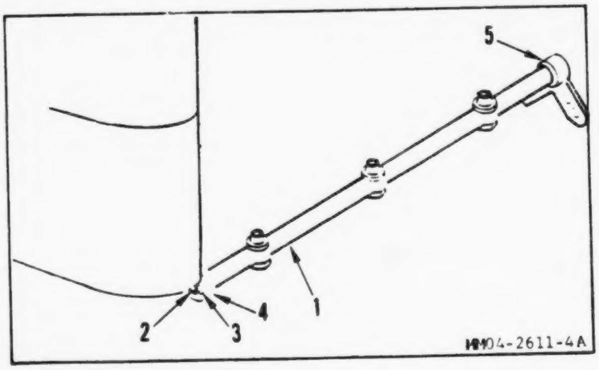
1. **Remove strut (1).**
   - a. Remove bolt (2) and washer (3) from lug (4) and strut (1).
   - b. Swing strut (1) clear of lug (4).
   - c. Slide strut (1) out of support (5).
2. **Remove three adjustable spacers (6) from strut (1).**

B. CLEANING

Clean all removed and attaching parts (para 1-5-36).

C. INSPECTION

1. **Check lug, support, and spacers for cracks or bending.**
   None allowed.
2. **Check lug, support, and spacers for corrosion.**
   (para 1-5-38).



D. INSTALLATION

1. **Install three spacers (6) in strut (1).**
2. **Install strut (1).**
   - a. Insert strut (1) into support (5).
   - b. One person spring lug (4) outboard of strut (1).
   - c. Aline free end of strut (1) on lug (4).
   - d. Install bolt (2) and washer (3).

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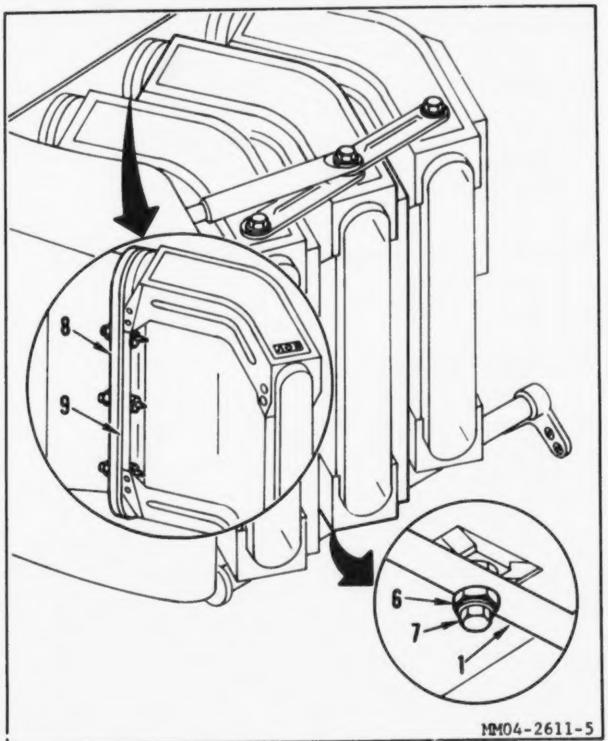
4-6-5. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE STRUCTURAL SUPPORT REMOVAL/INSTALLATION (cont)

NOTE

Lower support strut nozzle bolts will not be lockwired until spacers are adjusted.

3. **Install No. 1 and No. 2 engine center secondary nozzle** (para 4-6-4).
4. **Install No. 1 or No. 2 engine inboard secondary nozzle** (para 4-6-3).
5. **Install No. 1 or No. 2 engine outboard secondary nozzle** (para 4-6-2).
6. **Loosen three lower support strut nozzle bolts (7).**
7. **Adjust three spacers (6) in or out of strut (1) to aline three support seals (8) on mating nozzle flanges (9).**
8. **Lockwire bolts (7) to spacers (6) and strut (1).** Use lockwire (E29).
9. **Inspect (TI).**



END OF TASK

4-6-6. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE UPPER SUPPORT STRUT AND CLEVIS REMOVAL/INSTALLATION 4-6-6

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. REPAIR E. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Materials/Parts:

	Cotter Pin
(E29)	Lockwire

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

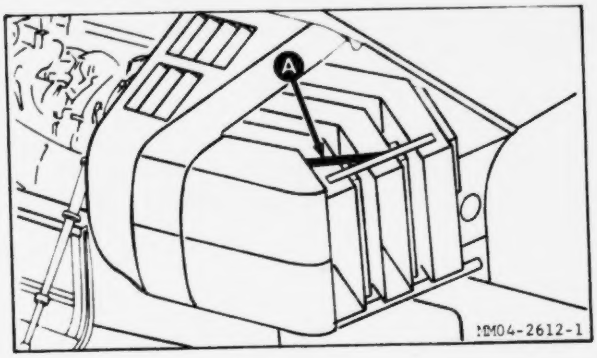
Ref	Condition
1-7-2	Helicopter safed

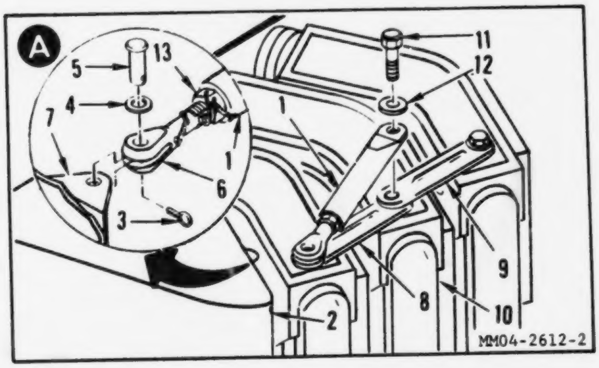
NOTE

This is typical for No. 1 or No. 2 secondary nozzle upper support strut.

A. REMOVAL

1. **Disconnect secondary nozzle upper support strut (1) from fairing (2).**
   a. Remove and discard cotter pin (3).
   b. Remove washer (4) and pin (5) from clevis (6) and lug (7).
2. **Remove strut (1) from struts (8) and (9) and nozzle (10).** Remove bolt (11) and washer (12).
3. **Remove clevis (6) from strut (1).**
   a. Remove lockwire.
   b. Hold clevis (6).
   c. Loosen nut (13).
   d. Remove clevis (6) and nut (13) from strut (1).





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4-6-6. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE UPPER SUPPORT STRUT AND CLEVIS REMOVAL/INSTALLATION (cont) 4-6-6

B. CLEANING

Clean all removed and attaching parts (para 1-5-36).

C. INSPECTION

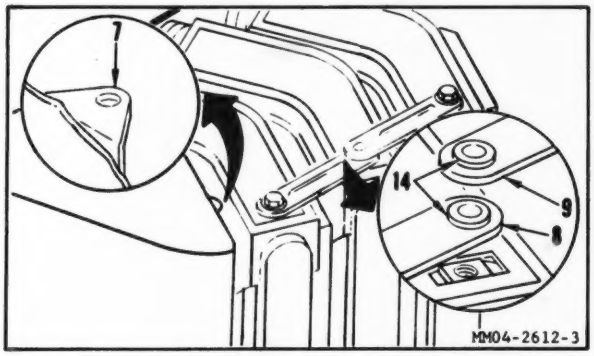
1. Check upper strut mounting area on struts for cracks, bends and loose or missing bushings. None allowed.

2. Check lug and clevis for cracks or bending. None allowed.

3. Check struts and lug for corrosion (para 1-5-38).

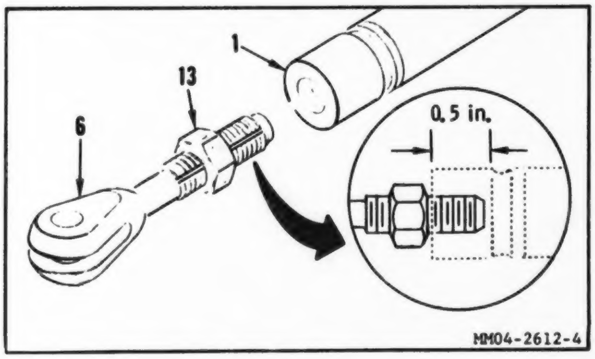
D. REPAIR

Repair bushing damage on struts (8) and (9) by replacing bushings (14) (para 4-6-9).



E. INSTALLATION

1. Install clevis (6) on strut (1).
   a. Install nut (13) on clevis (6).
   b. Install clevis (6) 0.5 INCH into strut (1).



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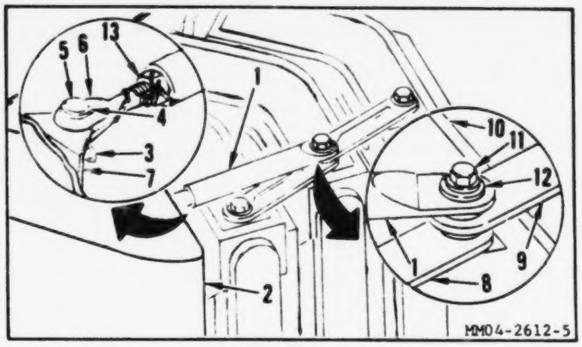
4-6-6. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE UPPER SUPPORT STRUT AND CLEVIS REMOVAL/INSTALLATION (cont) 4-6-6



NOTE

Sloped side of strut must face up.

2. **Install strut (1) on struts (8) and (9) and nozzle (10).**

   a. Aline strut (1) over struts (8) and (9) and nozzle (10) as shown.

   b. Install bolt (11) and washer (12).

3. **Adjust clevis (6).**

   a. Aline clevis (6) over lug (7).

   b. Try to insert pin (5) with washer (4) through clevis (6) and lug (7). If pin (5) fits, insert and go to step 4. If not, remove pin (5) and perform step 3c.

   c. Turn clevis (6) into or out of strut (1) until pin holes in clevis (6) and lug (7) can be alined without forcing. Then repeat step 3b.

4. **Connect strut (1) to fairing (2).** Install new cotter pin (3) on pin (5).

5. **Tighten bolt (11) on strut (1).**

6. **Tighten clevis nut (13).** Hold clevis (6).

7. **Lockwire nut (13) to clevis (6).** Use lockwire (E29).

8. **Inspect (TI).**

END OF TASK

4-6-7. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE INTERMEDIATE SUPPORT STRUT REMOVAL/INSTALLATION 4-6-7

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. REPAIR E. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Equipment Conditions:

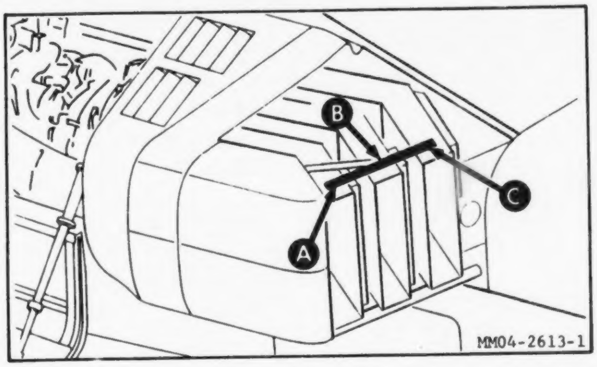
Ref	Condition
1-7-2	Helicopter safed

Personnel Required:

67R10 Attack Helicopter Repairer
66R30 Inspector/Supervisor

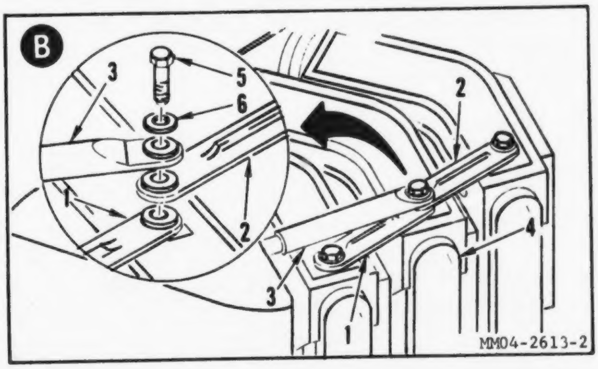
NOTE

This task is typical for No. 1 or No. 2 secondary nozzle intermediate support strut.



A. REMOVAL

1. **Disconnect secondary nozzle intermediate support struts (1) and (2) from strut (3) and nozzle (4).** Remove bolt (5) and washer (6).



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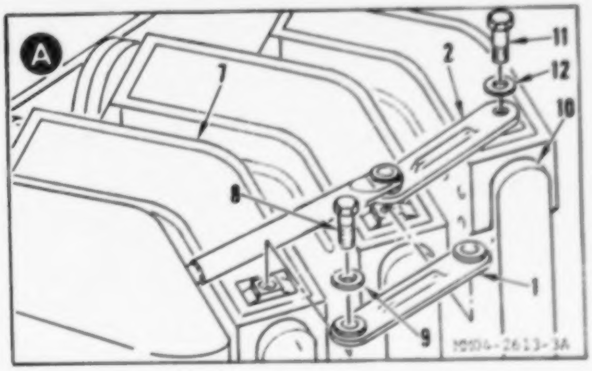
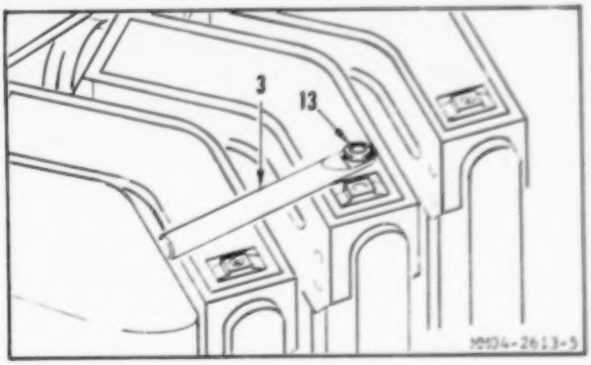
4-6-7. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE INTERMEDIATE SUPPORT STRUT REMOVAL/INSTALLATION (cont) 4-6-7

2. **Remove strut (1) from nozzle (7).** Remove bolt (8) and washer (9).

3. **Remove strut (2) from nozzle (10).** Remove bolt (11) and washer (12).





B. **CLEANING**

Clean all removed and attaching parts (para 1-5-36).

C. **INSPECTION**

1. **Check intermediate strut mounting area on strut for cracks, bending, and loose or missing bushing.** None allowed.

2. **Check strut for corrosion** (para 1-5-38).

D. **REPAIR**

1. **Repair bushing damage on strut (3) by replacing bushing (13).** (para 4-6-9).

GO TO NEXT PAGE

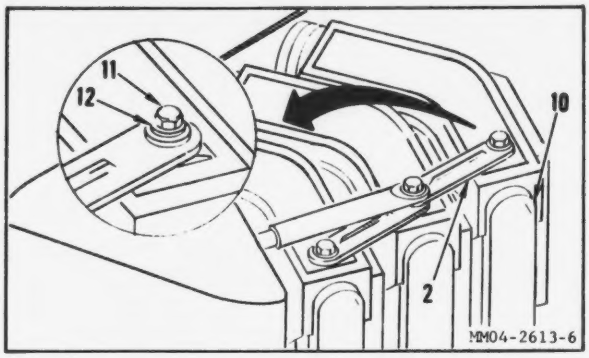
4-6-7. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE INTERMEDIATE SUPPORT STRUT REMOVAL/INSTALLATION (cont) 4-6-7

E. INSTALLATION

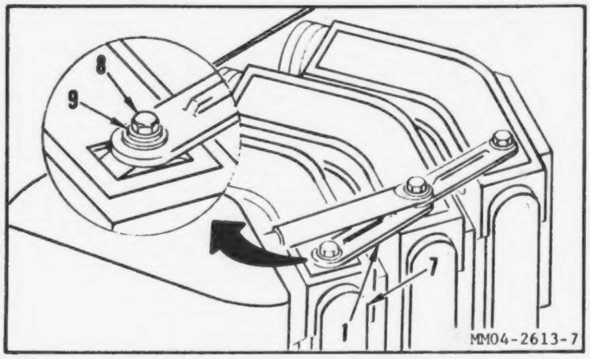
NOTE

Sloped sides of struts must face up.

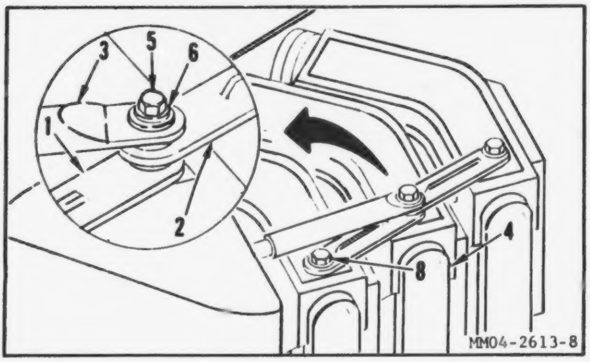
1. **Install strut (2) on nozzle (10.** Install bolt (11) and washer (12). Do not tighten bolt (11).



2. **Install strut (1) on nozzle (7).** Install bolt (8) and washer (9). Do not tighten bolt (8).



3. **Connect struts (1) and (2) to strut (3) and nozzle (4).**
   a. Aline struts (1) and (2) over nozzle (4) as shown.
   b. Aline strut (3) over struts (1) and (2).
   c. Install bolt (5) and washer (6).



4. **Tighten bolt (8) and (11).**

5. **Inspect (TI).**

END OF TASK

4-6-8. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE SUPPORT REMOVAL/INSTALLATION

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

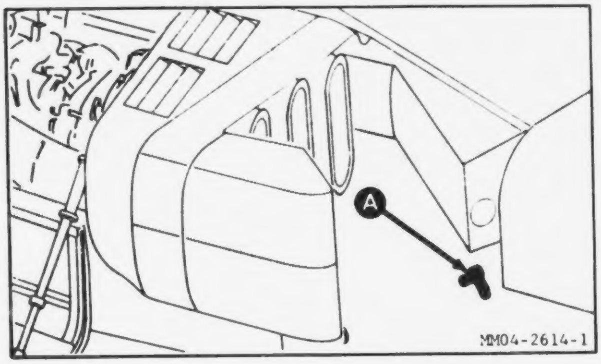
67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-6-2	No. 1 or No. 2 engine outboard secondary nozzle removed
4-6-4	No. 1 or No. 2 engine center secondary nozzle removed
4-6-5	No. 1 or No. 2 engine secondary nozzle lower support strut removed

NOTE

This task is typical for No. 1 or No. 2 secondary nozzle support.



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4-6-8. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE SUPPORT REMOVAL/INSTALLATION (cont)

A. REMOVAL

1. Remove four screws (1) and washers (2) from secondary nozzle aft strut support (3) and longeron (4).

2. Lift support (3) from longeron (4).

B. CLEANING

Clean all removed and attaching parts (para 1-5-36).

C. INSPECTION

Check longeron for corrosion (para 1-5-38).

D. INSTALLATION

1. Aline support (3) on longeron (4).

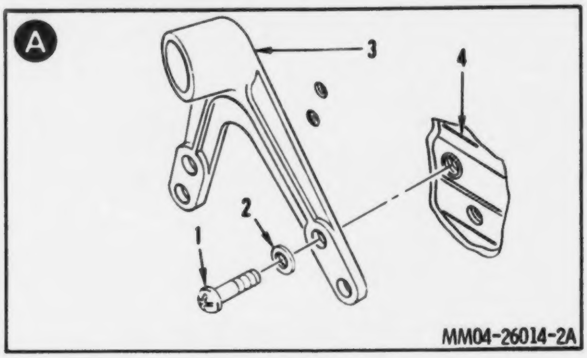
2. Install four screws (1) and washers (2).

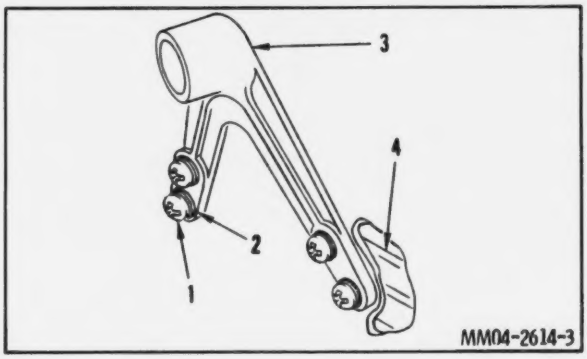
3. Inspect (TI).

4. Install No. 1 or No. 2 engine secondary nozzle lower support strut (para 4-6-5).

5. Install No. 1 or No. 2 engine center secondary nozzle (para 4-6-4).

6. Install No. 1 or No. 2 engine outboard secondary nozzle (para 4-6-2).





END OF TASK

4-6-9. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE UPPER AND INTERMEDIATE SUPPORT STRUT BUSHING REPLACEMENT (AVIM) 4-6-9

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Press, Arbor	3444-00-223-8359

Materials/Parts:

(E19)	Primer
(E54)	Preservative

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

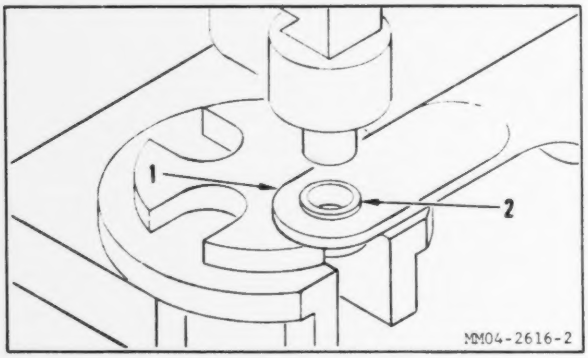
NOTE

This task is typical for all upper nozzle strut bushings.

A. REMOVAL

1. **Place strut (1) in arbor press.**

2. **Aline bushing (2), flange down, under press ram.**



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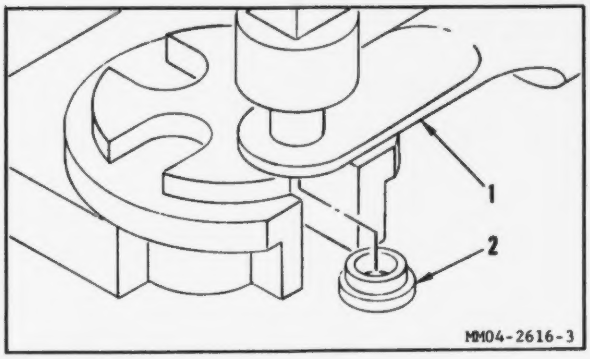
4-6-9. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE UPPER AND INTERMEDIATE SUPPORT STRUT BUSHING REPLACEMENT (AVIM) (cont) 4-6-9

NOTE

Arbor press ram adapter must be larger than bushing hole and smaller than bushing diameter.

3. **Press bushing (2) from strut (1).** Use arbor press. Discard bushing.

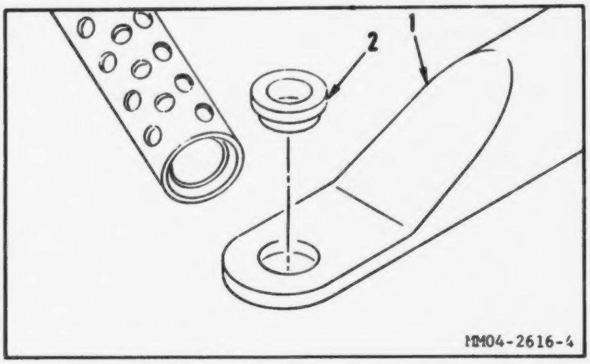


B. **CLEANING**

Clean strut in area of removed bushing (para 1-5-36).

C. **INSPECTION**

1. **Check strut for cracks and bending.** None allowed.
2. **Check strut for corrosion** (para 1-5-38).



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4-6-9. NO. 1 OR NO. 2 ENGINE SECONDARY NOZZLE UPPER AND INTERMEDIATE SUPPORT STRUT BUSHING REPLACEMENT (AVIM) (cont) 4-6-9

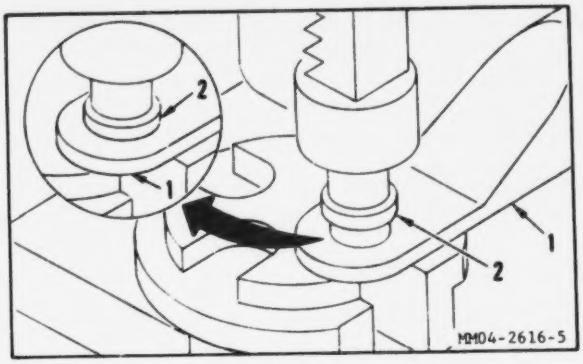
D. INSTALLATION

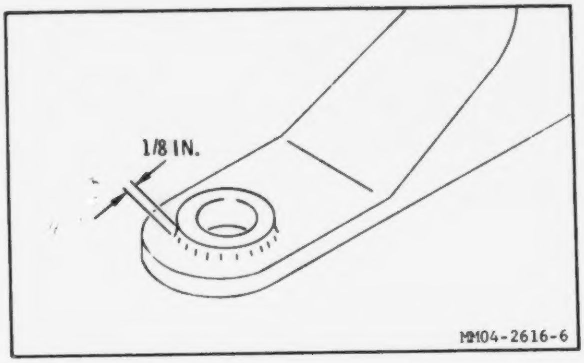
1. Place strut (1) in arbor press as shown.

2. Aline bushing (2) and hole in strut (1) under press ram.

3. Press bushing (2) into strut (1). Apply steady pressure until bushing bottoms in strut. Use arbor press.

4. Inspect (TI).





END OF TASK

4-6-10. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE SUPPORT BUSHING REPLACEMENT (AVIM)

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Airframe Repairer's	5180-00-323-4876

References:

TM 55-1500-204-25/1

Personnel Required:

68G10 Aircraft Structural Repairer
66R30 Inspector/Supervisor

NOTE

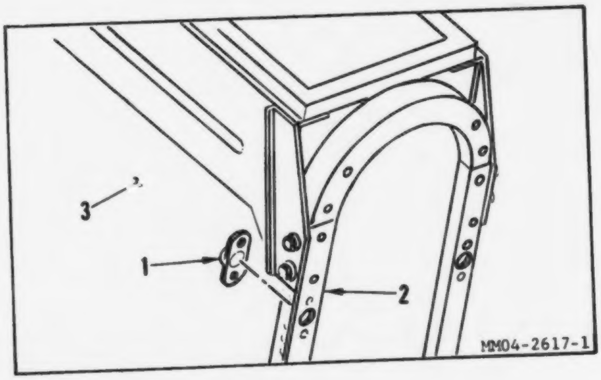
This task is typical for all nozzle support bushings.

A. REMOVAL

WARNING

Fuel deposits on nozzles may be toxic. Use care to prevent cuts from fins and flanges. If injury occurs, flush skin with water and seek medical aid.

1. **Remove rivets from nozzle support pin bushing (1) and flange (2).**
2. **Remove and discard bushing (1).**



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4-6-10. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE SUPPORT BUSHING REPLACEMENT (AVIM) (cont)

B. CLEANING

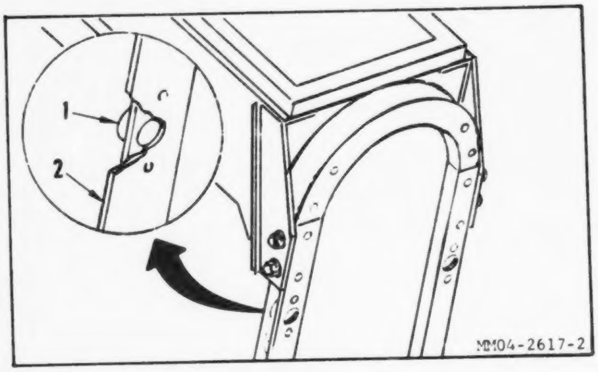
Clean flange (para 1-5-36).

C. INSPECTION

1. Check flange and nozzle body for cracks and burning. None allowed.
2. Check flange and body for corrosion (para 1-5-38).

D. INSTALLATION

1. Aline new bushing (1) on inner face of flange .
2. Rivet bushing (1) to flange (2) (TM 55-1500-204-25/1).
3. Inspect (TI).



END OF TASK

4-6-11. NO. 1 AND NO. 2 ENGINE OUTBOARD AND CENTER SECONDARY NOZZLE VERTICAL HEAT SHIELD AND SUPPORT CLIP REMOVAL/INSTALLATION 4-6-11

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. REPAIR E. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Materials/Parts:

	Insulation
(E19)	Primer
(E12)	Sealant

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1500-204-25/1

Equipment Conditions:

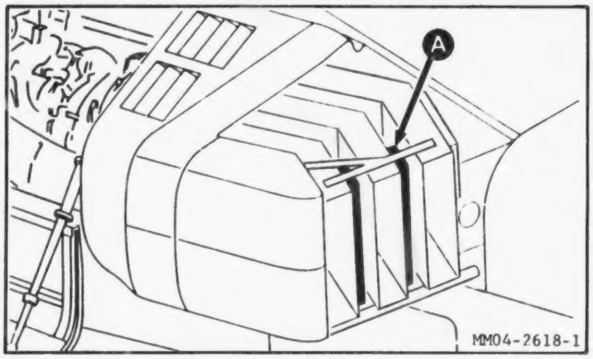
Ref	Condition
1-7-2	Helicopter safed

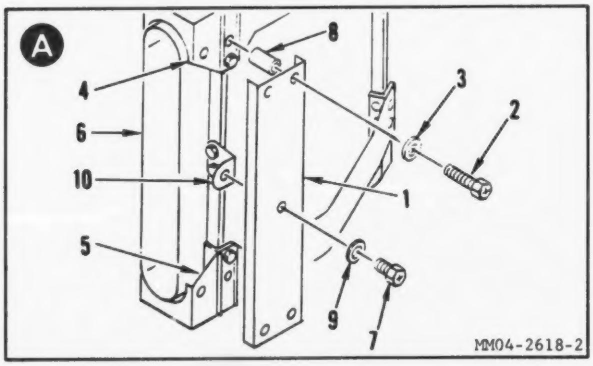
NOTE

This task is typical for No. 1 or No. 2 outboard and center secondary nozzle vertical heat shield.

A. REMOVAL

1. **Remove secondary nozzle vertical heat shield (1).**
   a. Remove four corner screws (2) and washers (3) from shield (1), horizontal shields (4) and (5), and nozzle (6).
   b. Remove screw (7) and washer (9) from shield (1) and shield support clip (10).
   c. Remove four spacers (8) from under shield (1).





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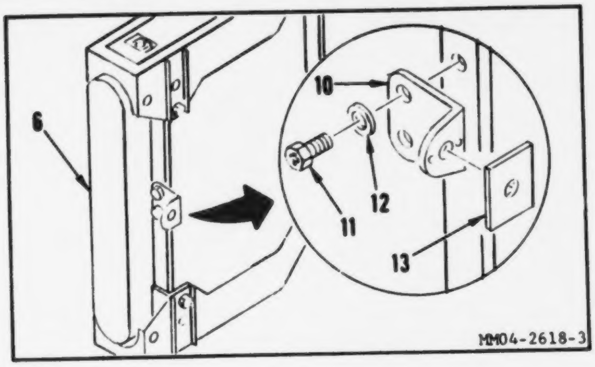
4-6-11. NO. 1 AND NO. 2 ENGINE OUTBOARD AND CENTER SECONDARY NOZZLE VERTICAL HEAT SHIELD AND SUPPORT CLIP REMOVAL/INSTALLATION (cont) 4-6-11



2. **Remove shield support clip (10).** Remove two screws (11) and washers (12) from clip (10) and nozzle (6).

3. **Remove and discard insulation (13).**

B. **CLEANING**

Clean outside of shields, nozzle, and clip (para 1-5-36).

C. **INSPECTION**

1. **Check shields, nozzle, and clip for stripped, bent, or loose nutplates.** None allowed.

2. **Check shields, nozzle, and clip for corrosion** (para 1-5-38).

3. **Check shields, nozzle, and clip for cracks.** None allowed.

D. **REPAIR**

1. **Repair nutplate damage by replacing defective nutplates.**

   a. Coat mounting surface of new nutplates being installed. Use primer (E19).

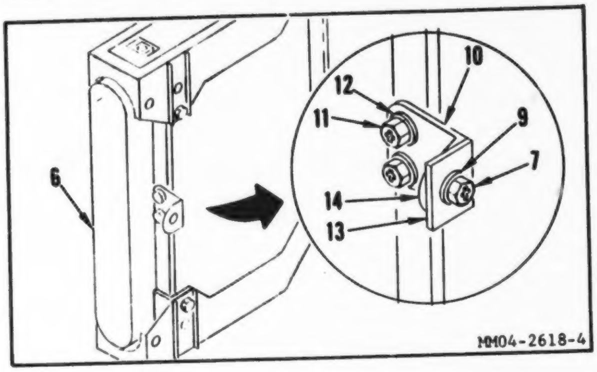
   b. Allow coated areas to cure 1 hour.

   c. Install new nutplates (TM 55-1500-204-25/1).

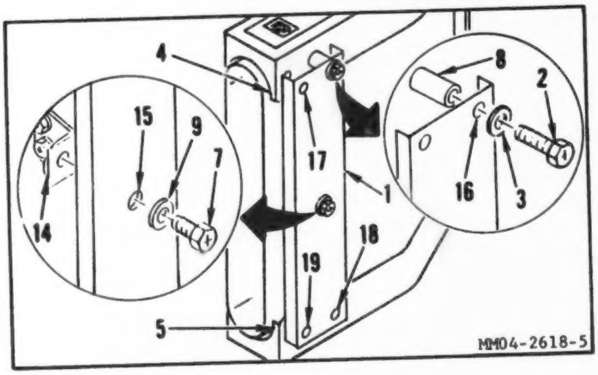
GO TO NEXT PAGE

4-6-11. NO. 1 AND NO. 2 ENGINE OUTBOARD AND CENTER SECONDARY NOZZLE VERTICAL HEAT SHIELD AND SUPPORT CLIP REMOVAL/INSTALLATION (cont) 4-6-11

E. INSTALLATION



1. **Install clip (10).**
   a. Center clip (10) on edge of nozzle (6) as shown.
   b. Install two screws (11) and washers (12).
   c. Clean outer clip flange (14) (para 1-5-36).
   d. Apply a thin coat of sealant to flange (14). Use sealant (E12).
   e. Secure new insulation (13) to flange (14). Use washer (9) and screw (7).
   f. Allow sealant to cure until insulation (13) cannot be lifted.
   g. Remove screw (7) and washer (9).



2. **Install shield (1).**
   a. Aline shield center hole (15) over flange (14).
   b. Install washer (9) and screw (7). Do not tighten screw.
   c. Aline corner holes (16) thru (19) over shields (4) and (5) as shown.
   d. Position one spacer (8) under alined hole (16).
   e. Install one washer (3) and screw (2). Do not tighten screw.

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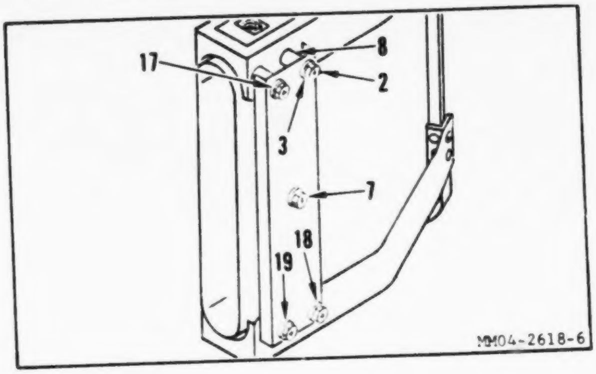
4-6-11. NO. 1 AND NO. 2 ENGINE OUTBOARD AND CENTER SECONDARY NOZZLE VERTICAL HEAT SHIELD AND SUPPORT CLIP REMOVAL/INSTALLATION (cont) 4-6-11



f. Repeat steps d and e at each hole (17) thru (19). Install remaining three spacers (8), washers (3), and screws (2). Do not tighten screws (2).

g. Tighten screw (7).

h. Tighten four screws (2).

3. **Inspect (TI).**

END OF TASK

4-6-12. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE HORIZONTAL HEAT SHIELD AND SHIELD PANEL REMOVAL/INSTALLATION 4-6-12

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. REPAIR E. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Materials/Parts:

(E19) Primer

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1500-204-25/1

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-6-2	No. 1 or No. 2 engine outboard secondary nozzle removed or
4-6-3	No. 1 or No. 2 engine inboard secondary nozzle removed or
4-6-4	No. 1 or No. 2 engine center secondary nozzle removed
4-6-11	No. 1 or No. 2 engine outboard or center nozzle vertical heat shield removed or
4-6-13	No. 1 or No. 2 engine inboard nozzle heat shield removed

NOTE

This task is typical for No. 1 or No. 2 secondary nozzle upper and lower horizontal heat shield.

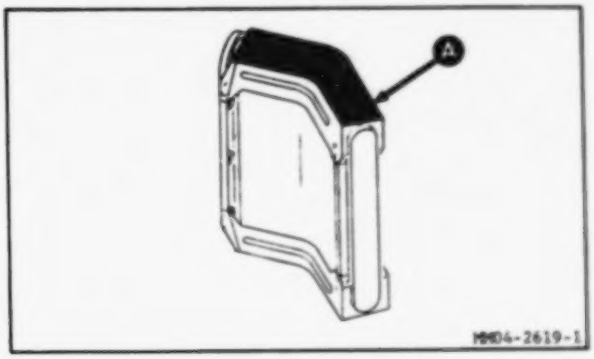
GO TO NEXT PAGE

4-6-12. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE HORIZONTAL HEAT SHIELD AND SHIELD PANEL REMOVAL/INSTALLATION (cont) 4-6-12

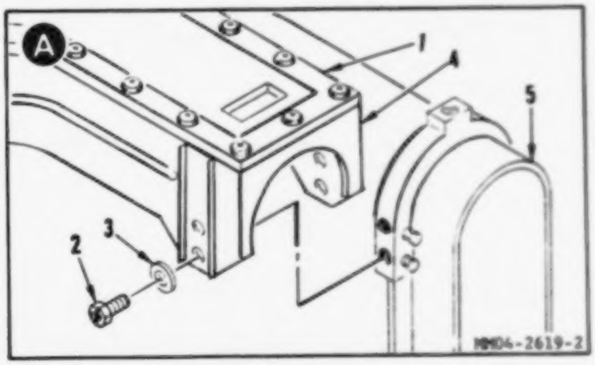
A. REMOVAL

WARNING

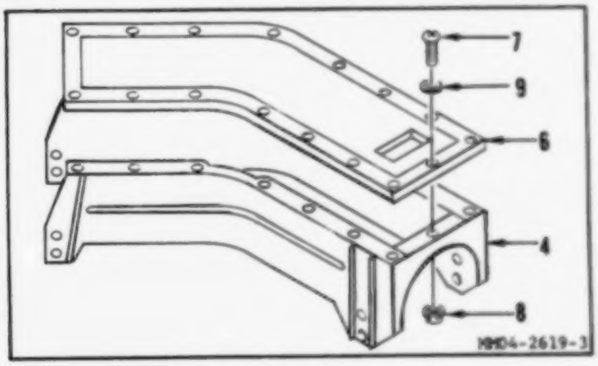
Fuel deposits on nozzles may be toxic. Use care to prevent cuts from fins and flanges. If injury occurs, flush skin with water and seek medical aid.



1. **Remove secondary nozzle top or bottom horizontal heat shield (1).**
   a. Remove eight screws (2) and washers (3) from support (4) and nozzle (5).
   b. Lift shield (1) up to remove from nozzle (5).



2. **Remove shield panel (6) from support (4).**
   a. Hold 16 screws (7).
   b. Remove 16 nuts (8).
   c. Remove 16 screws (7) and washers (9).



B. CLEANING

Clean outside of nozzle, panel, and support (para 1-5-36).

C. INSPECTION

1. **Check nozzle, and support for stripped, bent, or loose nutplates** (TM 55-1500-204-25/1).
2. **Check nozzle, panel, and support for corrosion** (para 1-5-38).
3. **Check nozzle, panel, and support for cracks.** None allowed.

GO TO NEXT PAGE

4-6-12. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE HORIZONTAL HEAT SHIELD AND SHIELD PANEL REMOVAL/INSTALLATION (cont) 4-6-12

D. REPAIR

Repair nutplate damage by replacing defective nutplates.

a. Coat mounting surface of new nutplates being installed. Use primer (E19).

b. Allow coated surfaces to cure 1 hour.

c. Install new nutplates (TM 55-1500-204-25/1).

E. INSTALLATION

1. Install panel (6) on support (4).

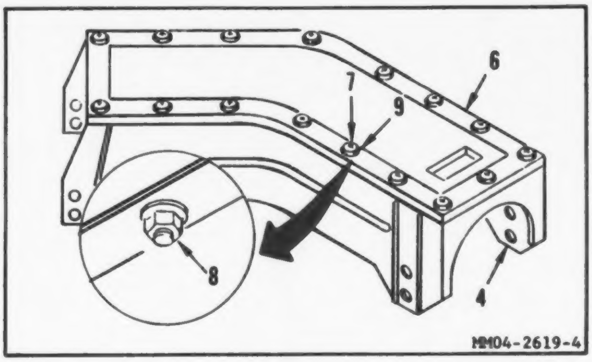
NOTE

Panel will fit only one way on support.

a. Insert 16 screws with 16 washers (9) through panel (6) and support (4).

b. Hold 16 screws (7).

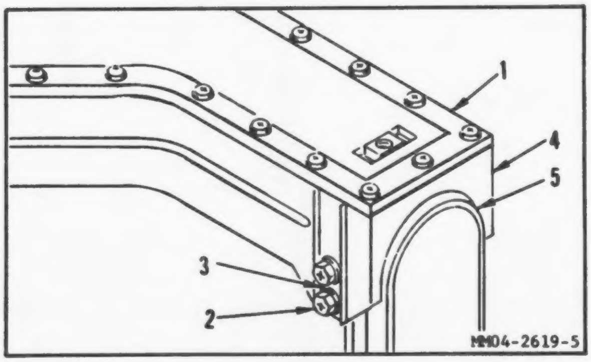
c. Install 16 nuts (8).



2. Install top or bottom shield (1).

a. Slide shield (1) onto nozzle (5) as shown.

b. Install eight screws (2) with eight washers (3) through support (4) and nozzle (5).



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4-6-12. NO. 1 AND NO. 2 ENGINE SECONDARY NOZZLE HORIZONTAL HEAT SHIELD AND SHIELD PANEL REMOVAL/INSTALLATION (cont) 4-6-12

3. Inspect (TI).

4. Install outboard or center nozzle vertical heat shield (para 4-6-11) or inboard nozzle heat shield (para 4-6-13).

5. Install No. 1 or No. 2 engine outboard secondary nozzle (para 4-6-2), No. 1 or No. 2 engine inboard secondary nozzle (para 4-6-3), or No. 1 or No. 2 engine center secondary nozzle (para 4-6-4).

END OF TASK

4-6-13. NO. 1 AND NO. 2 ENGINE INBOARD SECONDARY NOZZLE HEAT SHIELD AND SUPPORT CLIP REMOVAL/INSTALLATION 4-6-13

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. REPAIR E. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Materials/Parts:

(E19)	Primer
(E12)	Sealant

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-204-25/1

Equipment Conditions:

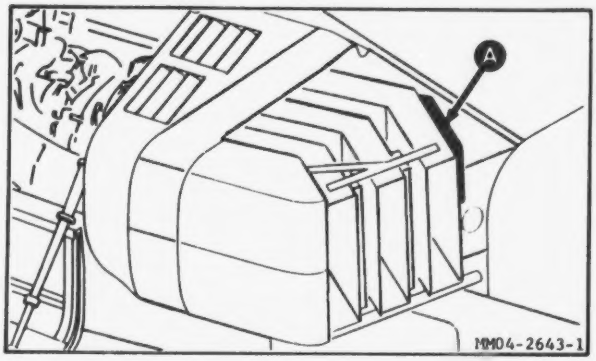
Ref	Condition
1-7-2	Helicopter safed
4-6-3	No. 1 or No. 2 engine inboard secondary nozzle removed

NOTE

This task is typical for No. 1 or No. 2 inboard secondary nozzle heat shield and support clip.

A. REMOVAL

1. **Remove inboard secondary nozzle heat shield (1).**
   a. Remove seven upper screws (2) and washers (3) from shield (1), horizontal shield (4), and nozzle (5).
   b. Remove screw (6) and washer (8) from shield (1) and shield support clip (9).
   c. Remove seven spacers (7) from under shield (1).



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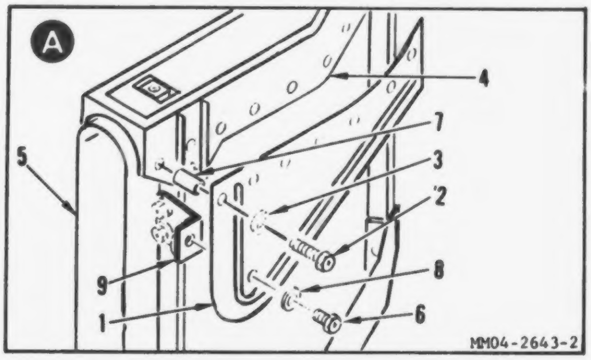

MM04-2643-2

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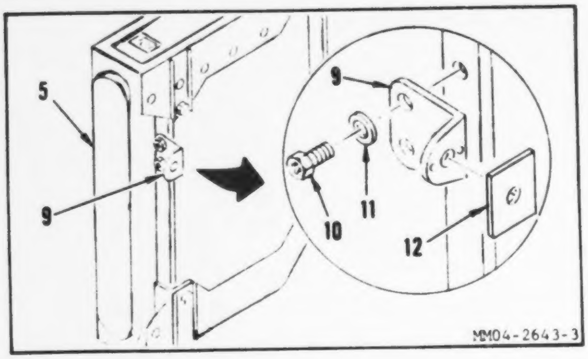
4-6-13. NO. 1 AND NO. 2 ENGINE INBOARD SECONDARY NOZZLE HEAT SHIELD AND SUPPORT CLIP REMOVAL/INSTALLATION (cont) 4-6-13

2. **Remove shield support clip (9).** Remove two screws (10) and washers (11) from clip (9) and nozzle (5).

3. **Remove and discard insulation (12).**



B. **CLEANING**

Clean outside of shields, nozzle, and clip (para 1-5-36).

C. **INSPECTION**

1. **Check shields, nozzle, and clip for stripped, bent, or loose nutplates** (TM 55-1500-204-25/1).

2. **Check shields, nozzle, and clip for corrosion** (para 1-5-38).

3. **Check shields, nozzle, and clip for cracks.** None allowed.

D. **REPAIR**

Repair nutplate damage by replacing defective nutplates.

a. Coat mounting surface of new nutplates being installed. Use primer (E19).

b. Allow coated areas to cure 1 hour.

c. Install new nutplates (TM 55-1500-204-25/1).

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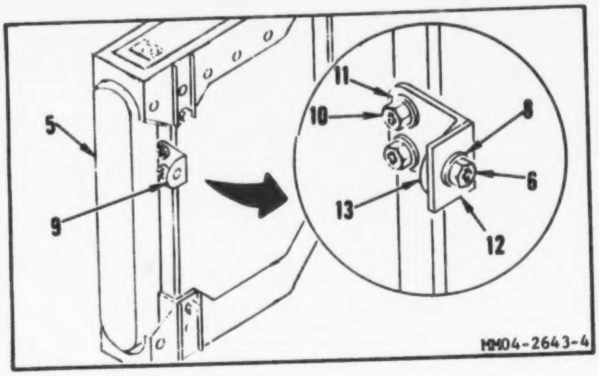
4-6-13. NO. 1 AND NO. 2 ENGINE INBOARD SECONDARY NOZZLE HEAT SHIELD AND SUPPORT CLIP REMOVAL/INSTALLATION (cont) 4-6-13



E. INSTALLATION

1. **Install clip (9).**

   a. Aline clip (9) on upper edge of nozzle (5).

   b. Install two washers (11) and screws (10).

   c. Clean outer clip flange (13) (para 1-5-30).

   d. Apply a thin coat of sealant to flange (13). Use sealant (E12).

   e. Secure new insulation (12) to flange (13). Use washer (8) and screw (6).

   f. Allow sealant to cure until insulation (12) cannot be lifted.

   g. Remove screw (6) and washer (8).

2. **Install shield (1).**

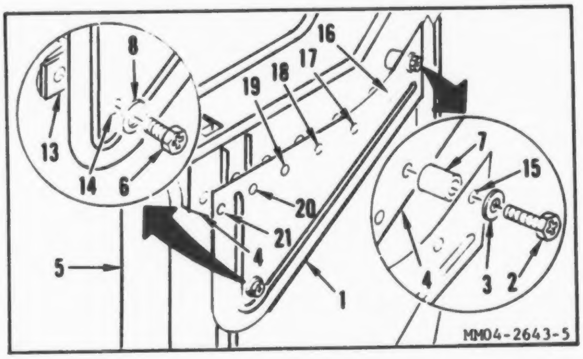
   a. Aline shield lower hole (14) over flange (13).

   b. Install washer (8) and screw (6). Do not tighten.

   c. Aline corner holes (15) thru (21) over shield (4) as shown.

   d. Position one spacer (7) under alined hole (15).

   e. Install washer (3) and one screw (2). Do not tighten screw (6).



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4-6-13. NO. 1 AND NO. 2 ENGINE INBOARD SECONDARY NOZZLE HEAT SHIELD AND SUPPORT CLIP REMOVAL/INSTALLATION (cont) 4-6-13

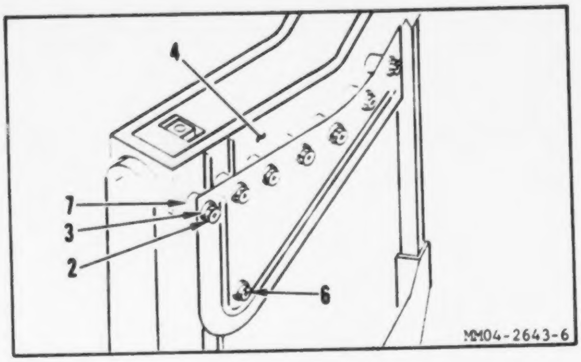
f. Repeat steps d and e at each hole. Install remaining seven spacers (7), washers (3) and screws (2).

g. Tighten screw (6).

h. Tighten seven screws (2).

3. **Inspect (TI).**

4. **Install No. 1 or No. 2 engine inboard secondary nozzle (para 4-6-3).**



END OF TASK

4-6-14. NO. 1 OR NO. 2 ENGINE SECONDARY NOZZLE PIN REPLACEMENT 4-6-14

This task covers: A. REMOVAL B. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

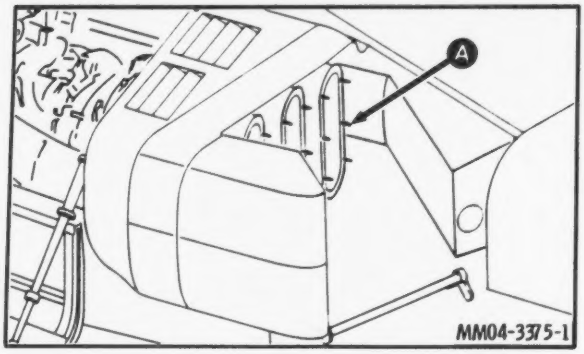
67R10 Attack Helicopter Repairer
66R30 Inspector/Supervisor

Equipment Conditions:

Ref	Condition
4-6-2	No. 1 or No. 2 engine outboard secondary nozzle removed or
4-6-3	No. 1 or No. 2 engine inboard secondary nozzle removed or
4-6-4	No. 1 or No. 2 engine center secondary nozzle removed

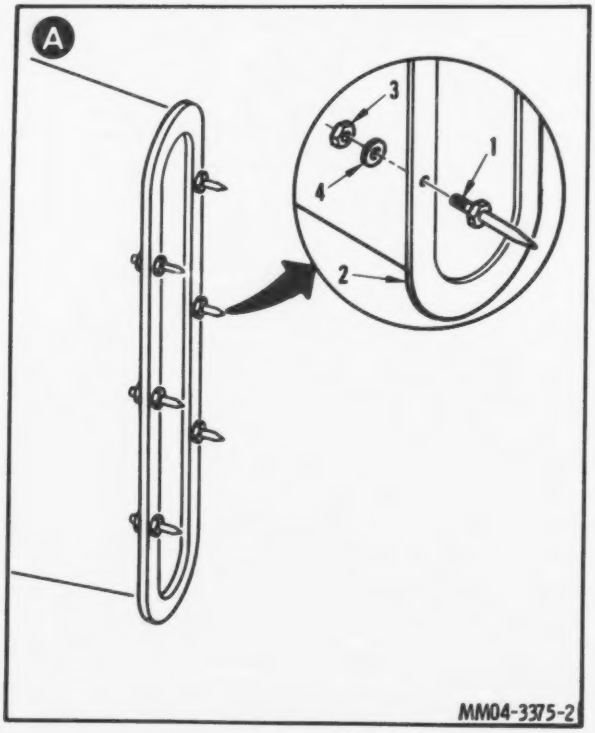
NOTE

This task is typical for all No. 1 or No. 2 secondary nozzle pins.



A. REMOVAL

1. **Remove secondary nozzle support pin (1) from support (2).**
   - a. Hold pin (1). Remove nut (3) and washer (4).
   - b. Remove pin (1) from support (2).



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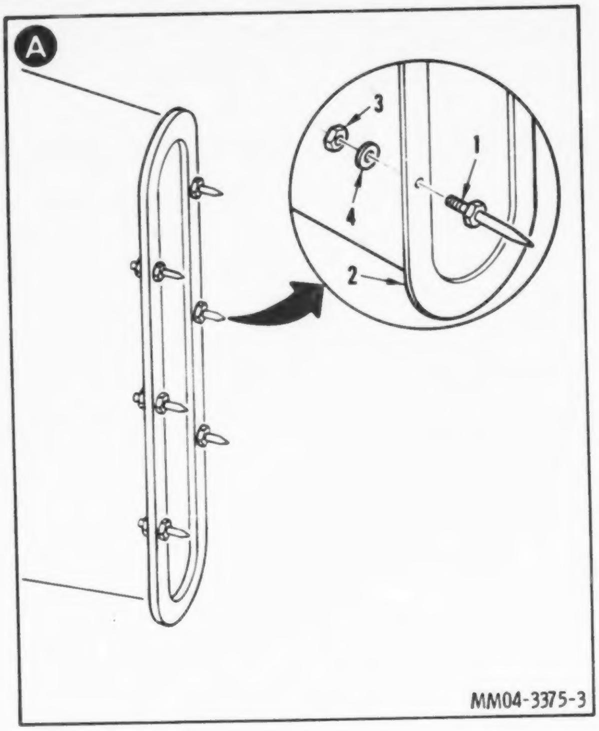
4-6-14. NO. 1 OR NO. 2 ENGINE SECONDARY NOZZLE PIN REPLACEMENT (cont) 4-6-14

B. INSTALLATION

1. **Install secondary nozzle support pin (1) into support (2).**
   a. Insert pin (1) through support assembly (2).
   b. Install washer (4) and nut (3) on pin (1).
   c. Hold pin (1). Tighten nut (3).
2. **Inspect (TI).**
3. **Install No. 1 or No. 2 engine center secondary nozzle (para 4-6-4) or install No. 1 or No. 2 engine outboard secondary nozzle (para 4-6-2) or install No. 1 or No. 2 engine inboard secondary nozzle (para 4-6-3).**



MM04-3375-3

END OF TASK

4-6-15. SECONDARY NOZZLE FRAME REMOVAL/INSTALLATION (AVIM) 4-6-15

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. REPAIR E. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Airframe Repairer's	5180-00-323-4876
Press, Arbor	3444-00-223-8359

Materials/Parts:

Bushing

Personnel Required:

68G10	Airframe Repairer
66R30	Inspector/Supervisor

References:

TM 55-1500-204-25/1

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-5-15	Secondary nozzle vertical heat shield removed
4-5-16	Secondary nozzle horizontal heat shield removed

NOTE

This task is typical for all secondary nozzle frames.

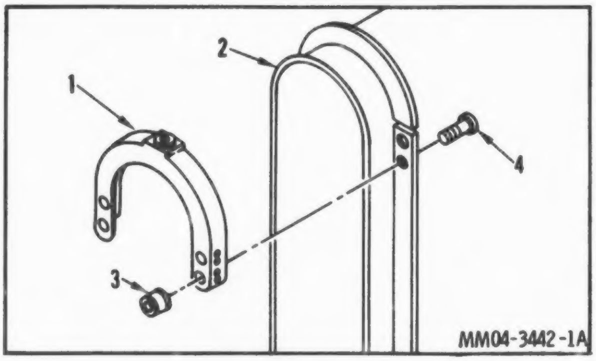
A. **REMOVAL**

1. **Remove frame (1) from secondary nozzle (2).**

   a. Remove four pin collars (3) from pin rivets (4).

   b. Remove four pin rivets (4) from nozzle (2) and frame (1).

   c. Remove frame (1) from nozzle (2).



B. **CLEANING**

Wipe all removed and attaching parts with a clean rag.

C. **INSPECTION**

1. **Check frame for cracks. Check nutplates for stripped threads.** None allowed.

2. **Check frame for corrosion** (para 1-5-38).

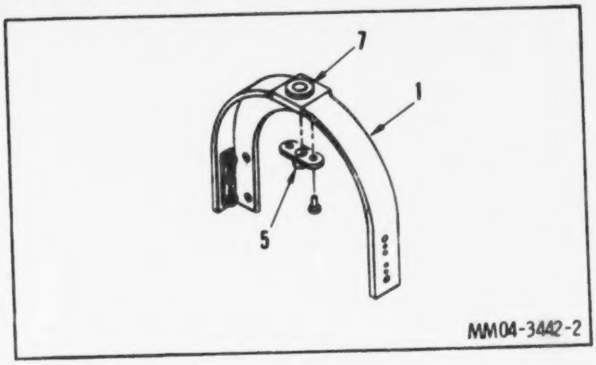
GO TO NEXT PAGE

4-6-15. SECONDARY NOZZLE FRAME REMOVAL/INSTALLATION (AVIM) (cont) 4-6-15

D. REPAIR

1. **Repair frame (1) by replacing bushing (7).**

   a. Remove nutplate (5) from frame (1) (TM 55-1500-204-25/1).

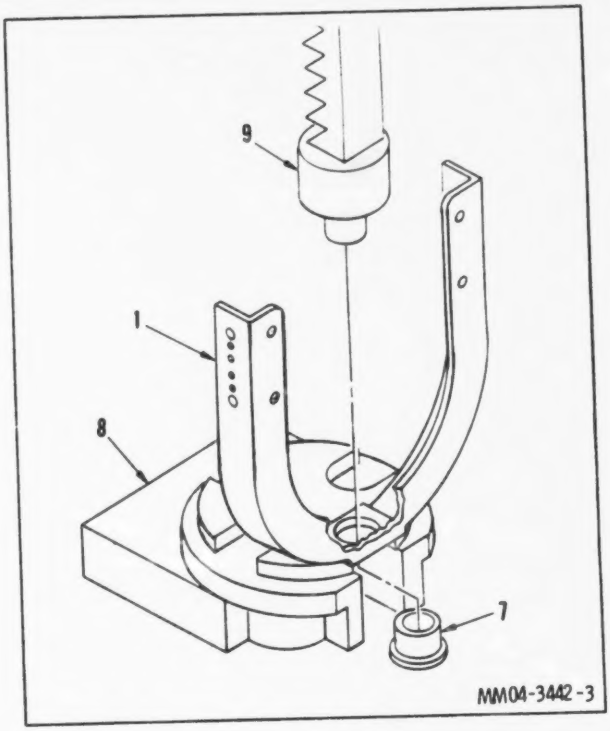


MM04-3442-2

   b. Place frame (1) in arbor press (8).

   c. Aline bushing (7) flange down, under press ram (9).

   d. Press bushing (7) from frame (1). Discard bushing (7).



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4-6-15. SECONDARY NOZZLE FRAME REMOVAL/INSTALLATION (AVIM) (cont) 4-6-15

e. Reposition frame (1) in arbor press (8).

f. Aline new bushing (7), flange up, under press ram (9) and hole in nozzle frame (1).

g. Press bushing (7) in nozzle frame (1). Apply steady pressure until bushing (7) bottoms in frame (1).

2. **Install nutplate (5) on frame (1)** (TM 55-1500-204-25/1).

3. **Inspect (TI).**

E. **INSTALLATION**

1. **Install frame (1) on secondary nozzle (2).**

a. Aline holes of frame (1) with holes in nozzle (2).

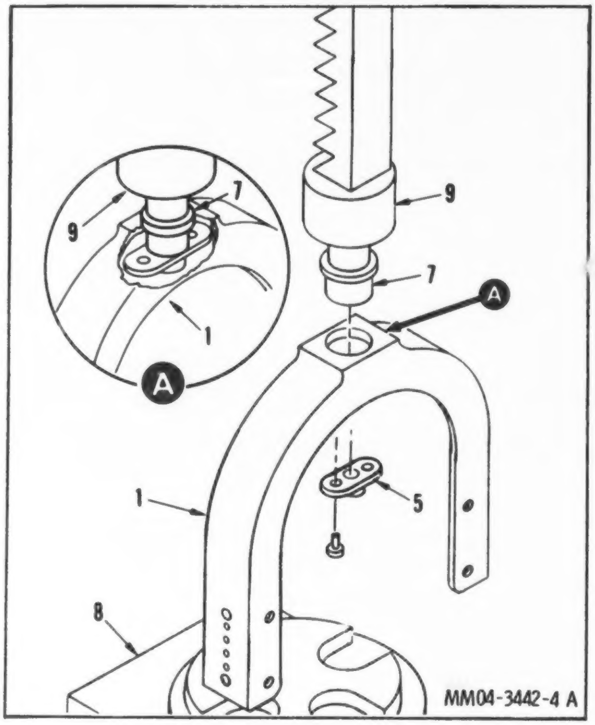
b. Install four pin rivets (4) through frame (1) and nozzle (2).

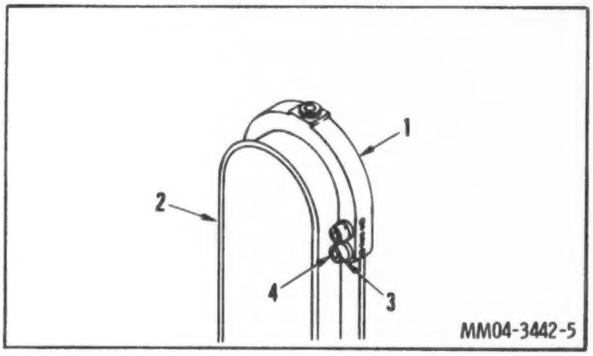
c. Install four pin collars (3) on pin rivets (4), (TM 55-1500-204-25/1).

2. **Inspect (TI).**

3. **Install secondary nozzle horizontal heat shield** (para 4-6-12).

4. **Install secondary nozzle vertical heat shield** (para 4-6-11).





END OF TASK

Section VII. IGNITION SYSTEM MAINTENANCE

(REFER TO TM 55-2840-248-23)

SECTION VIII. POWER CONTROLS MAINTENANCE

4-8-1. NO. 1 ENGINE POWER AVAILABLE SPINDLE GEARBOX REMOVAL/INSTALLATION 4-8-1

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Aviation Ground Power Unit	1730-01-144-1897
Wrench, Torque, 3/8 Drive	5120-00-288-8865
Adapter, Torque 5/16 3/8 Drive	5120-01-074-6573

References:

TM 55-1520-238-T

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door LN1 opened
4-8-3	No. 1 engine load demand spindle gearbox removed

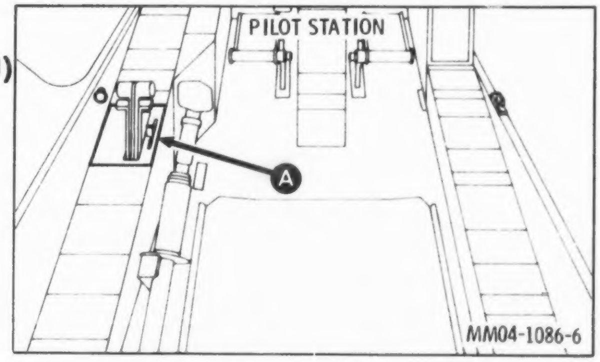
Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

A. **REMOVAL**

1. **Connect aviation ground power unit (AGPU)** (para 1-7-16 and 1-7-18).

2. **Enter pilot station** (para 1-7-1). **Observe all safety precautions.**



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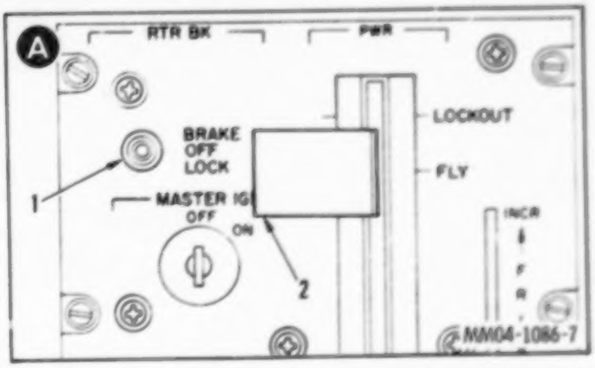
4-8-1. NO. 1 ENGINE POWER AVAILABLE SPINDLE GEARBOX REMOVAL/INSTALLATION (cont) 4-8-1

3. **Set RTR BK switch (1) to OFF.**

4. **Set pilot No. 1 PWR lever (2) to FLY.**

5. **Disconnect AGPU** (para 1-7-16 and 1-7-18).


A
RTR BK
PWR
BRAKE
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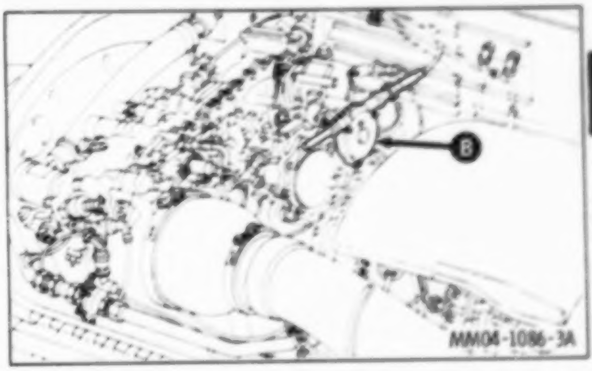
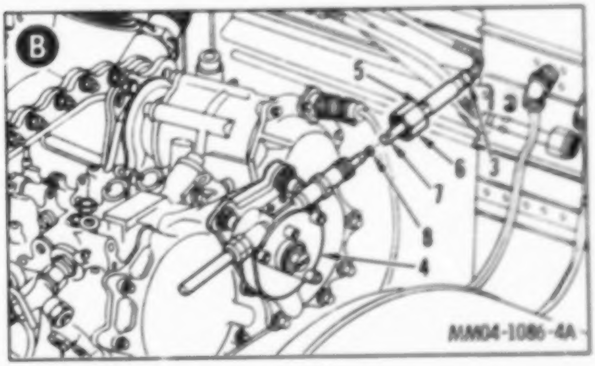
MASTER IG
OFF
ON
LOCKOUT
FLY
INCR
1
2
MM04-1086-7



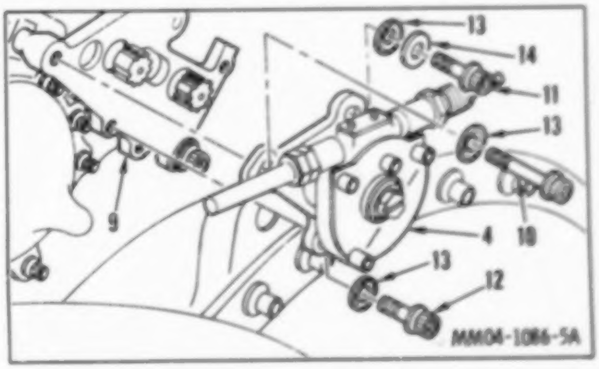
MM04-1086-3A

6. **Disconnect cable (3) from power available spindle gearbox (4).**
   a. Hold cable flats (5).
   b. Remove coupling nut (6).
   c. Disconnect cable fitting (7) from spindle gearbox fitting (8).



MM04-1086-4A

7. **Remove gearbox (4) from baseplate (9).**
   a. Remove three bolts (10), (11), and (12); three countersunk washers (13); and flat washer (14).
   b. Pull gearbox (4) aft from baseplate (9).


13
14
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MM04-1086-5A

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4-8-1. NO. 1 ENGINE POWER AVAILABLE SPINDLE GEARBOX REMOVAL/INSTALLATION (cont) 4-8-1

B. CLEANING

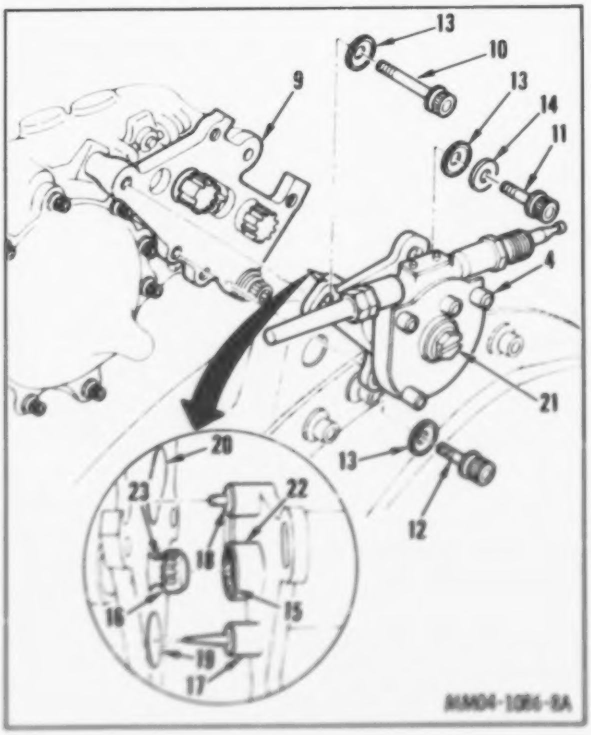
Clean baseplate (para 1-5-36).

C. INSPECTION

1. Check cable for cracked, bent, or loose fitting. None allowed.
2. Check cable fitting and exposed baseplate for corrosion (para 1-5-38).
3. Check baseplate for nicks and scratches. Maximum depth not to exceed 0.015 inch.
4. Check splines for visible cracks and wear. None allowed.

D. INSTALLATION

1. Install gearbox (4) on baseplate (9). Torque three bolts (10), (11), and (12) to **60 INCH-POUNDS**.
   - a. Aline pins (17) and (18) with holes (19) and (20).
   - b. Aline hub wide tooth space (15) with spline wide tooth (16). Rotate slot (21) to aline.
   - c. Slide hub (22) on spline (23).
   - d. Install long bolt (10), bolts (11) and (12); flat washer (14); and three countersunk washers (13).
   - e. Torque three bolts (10), (11), and (12) to **60 INCH-POUNDS**. Use 5/16 torque adapter.



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4-8-1. NO. 1 ENGINE POWER AVAILABLE SPINDLE GEARBOX REMOVAL/INSTALLATION (cont) 4-8-1

2. **Connect cable (3) to gearbox (4).** Torque coupling nut (6) to **70 INCH-POUNDS.**

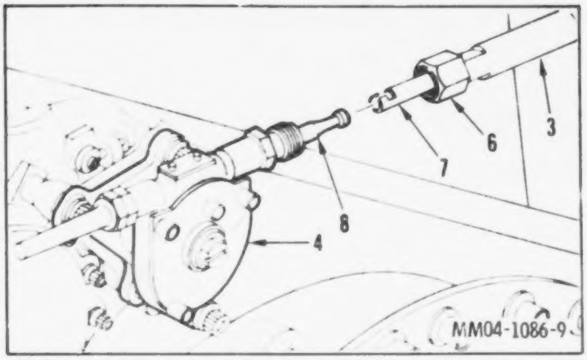
   a. Connect cable fitting (7) to gearbox fitting (8).

   b. Install coupling nut (6) on gearbox (4).

   c. Hold cable flats (5).

   d. Torque coupling nut (6) to **70 INCH-POUNDS.**

3. **Inspect (TI).**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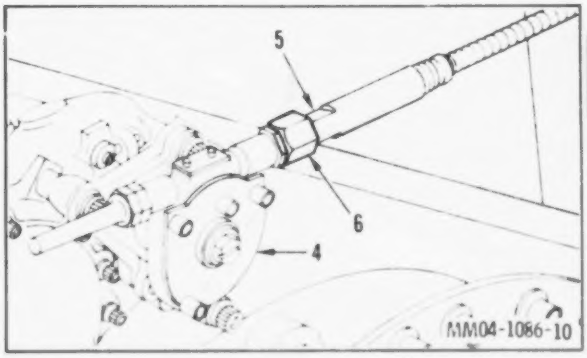
MM04-1086-9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MM04-1086-10

4. **Enter pilot station (para 1-7-1). Observe all safety precautions.**

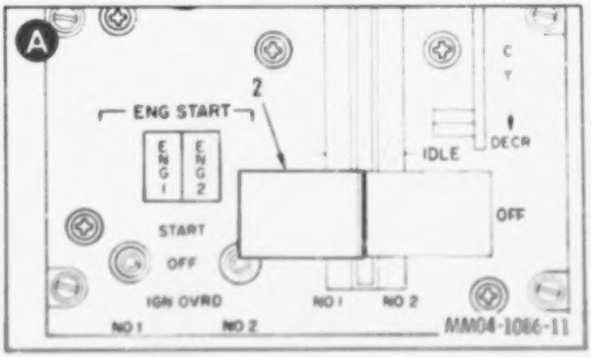
5. **Set pilot No. 1 PWR lever (2) to OFF.**

6. **Install No. 1 engine load demand spindle gearbox (para 4-8-3).**

7. **Perform No. 1 engine power available spindle rigging check (para 4-8-36).**

8. **Perform power plant operational check (engine 1) (TM 55-1520-238-T.**

9. **Secure engine work platform door LNI (para 2-2-2).**


A
2
ENG START
ENG 1
ENG 2
START
OFF
IGN OVRD
NO 1
NO 2
C
Y
DECR
IDLE
OFF
NO 1
NO 2
MM04-1086-11

END OF TASK

4-8-2. NO. 2 ENGINE POWER AVAILABLE SPINDLE GEARBOX REMOVAL/INSTALLATION 4-8-2

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 3/8 Drive	5120-00-288-8865
Adapter, Torque 5/16, 3/8 Drive	5120-01-074-6573

Ref

Personnel Required:

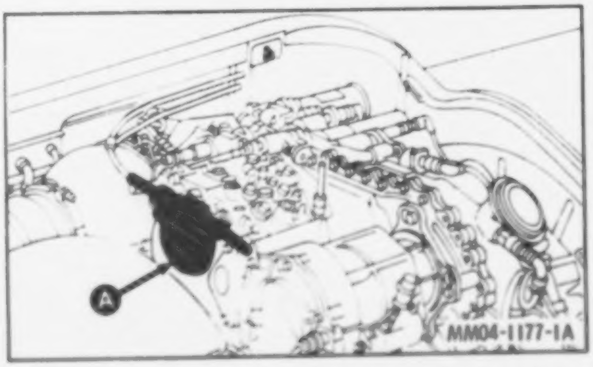
67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

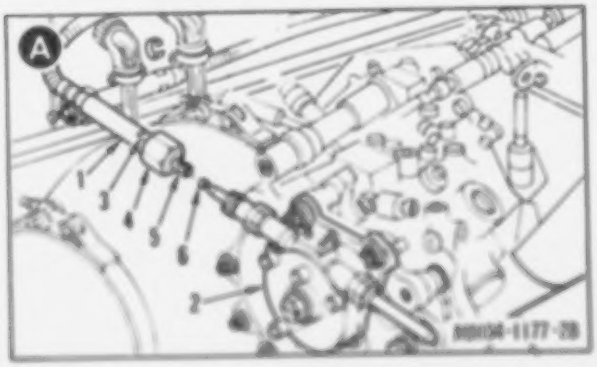
Equipment Conditions:

Condition	
1-7-2	Helicopter safed
2-2-2	Engine work platform door RN1 opened
4-8-4	No. 2 engine load demand spindle gearbox removed



A. REMOVAL

1. **Disconnect cable (1) from power available spindle gearbox (2).**
   - a. Hold cable flats (3).
   - b. Remove coupling nut (4).
   - c. Disconnect cable fitting (5) from gearbox fitting (6).



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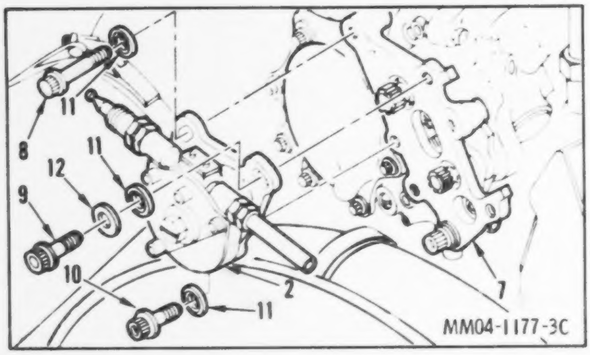
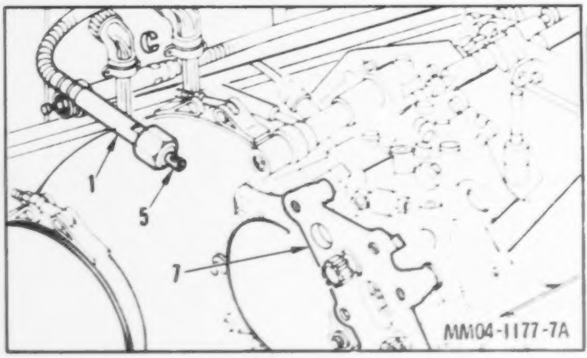
4-8-2. NO. 2 ENGINE POWER AVAILABLE SPINDLE GEARBOX REMOVAL/INSTALLATION (cont) 4-8-2





2. **Remove gearbox (2) from baseplate (7).**

   a. Remove bolts (8), (9), and (10); three countersunk washers (11); and flat washer (12).

   b. Pull gearbox (2) aft from baseplate (7).

B. **CLEANING**

Clean baseplate (para 1-5-36).

C. **INSPECTION**

1. **Check cable for cracked, bent, or loose fitting.** None allowed.

2. **Check cable fitting and exposed baseplate for corrosion** (para 1-5-38).

3. **Check baseplate for nicks and scratches.** Maximum depth not to exceed **0.015 INCH.**

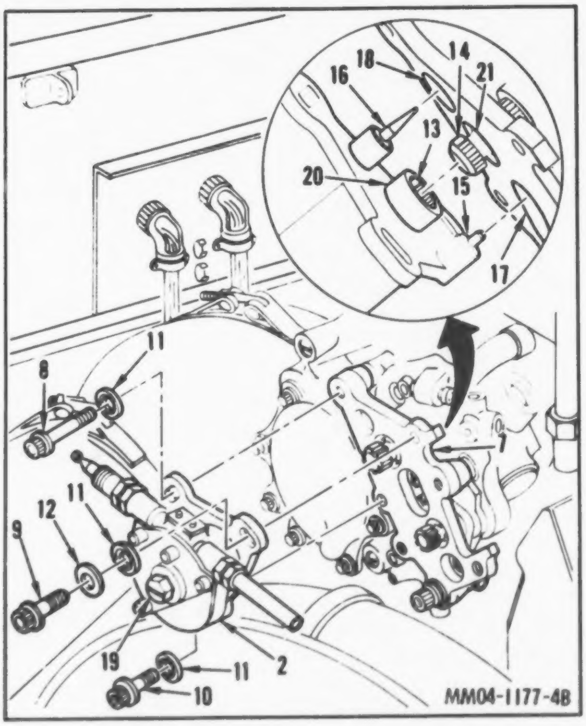
4. **Check splines for visible nicks and wear.** None allowed.

GO TO NEXT PAGE

4-8-2. NO. 2 ENGINE POWER AVAILABLE SPINDLE GEARBOX REMOVAL/INSTALLATION (cont) 4-8-2

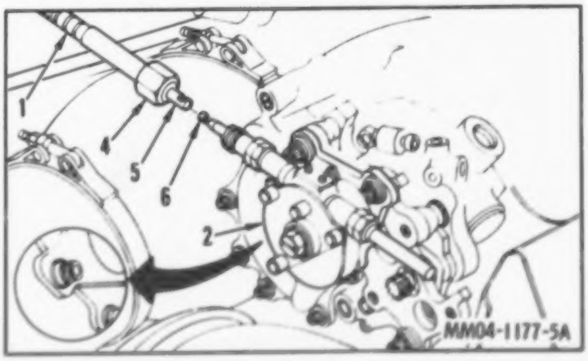
D. INSTALLATION

1. **Install gearbox (2) on baseplate (7). Torque bolts (8), (9), and (10) to 60 INCH-POUNDS.**
   a. Aline pins (15) and (16) with holes (17) and (18).
   b. Aline hub wide tooth space (13) with spline wide tooth (14). Rotate slot (19) to aline.
   c. Slide hub (20) on spline (21).
   d. Install long bolt (8), bolts (9) and (10), flat washer (12), and three countersunk washers (11).
   e. Torque bolts (8), (9), and (10) to 60 INCH-POUNDS. Use 5/16 torque adapter.



MM04-1177-4B

2. **Connect cable (1) to gearbox (2). Torque coupling nut (4) to 70 INCH-POUNDS.**
   a. Connect cable fitting (5) to gearbox fitting (6).
   b. Install coupling nut (4) on gearbox (2).
   c. Hold cable flats (3).
   d. Torque coupling nut (4) to 70 INCH-POUNDS.



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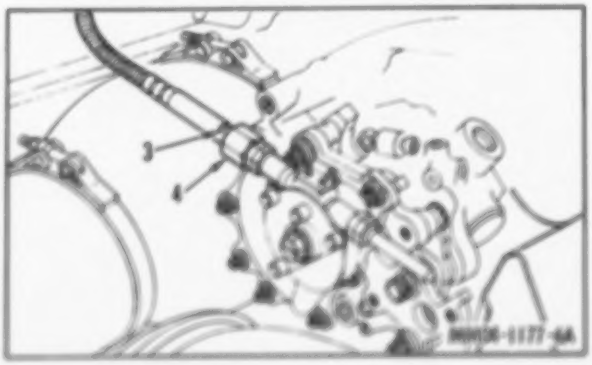


MM04-1177-6A

3. **Inspect (TI).**
4. **Install No. 2 engine load demand spindle gearbox (para 4-8-4).**
5. **Perform No. 2 engine power available spindle rigging check (para 4-8-37).**
6. **Perform power plant operational check (engine 2) (TM 55-1520-238-T).**
7. **Secure engine work platform door door RN1 (para 2-2-2).**

END OF TASK

4-8-3. NO. 1 ENGINE LOAD DEMAND SPINDLE GEARBOX REMOVAL/INSTALLATION 4-8-3

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Aviation Ground Power Unit	1730-01-144-1897
Wrench, Torque, 3/8 Drive	5120-00-288-8865
Adapter, Torque 5/16, 3/8 Drive	5120-01-074-6573

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access door LN1 opened

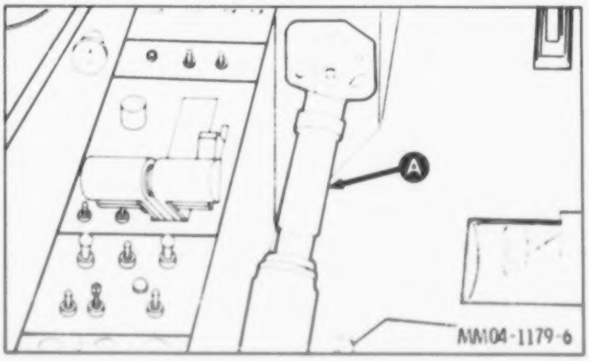
A. REMOVAL

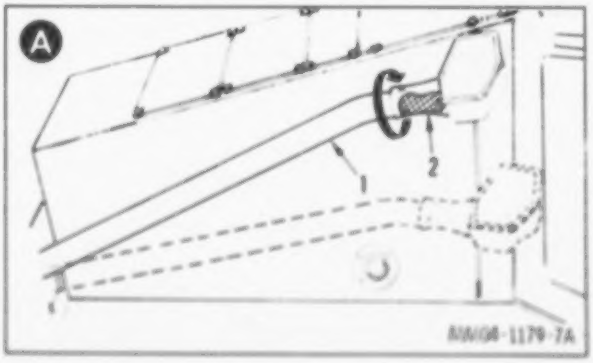
1. **Connect aviation ground power unit (AGPU)** (para 1-7-16 and 1-7-18).

2. **Enter pilot station** (para 1-7-1). **Observe all safety precautions.**

3. **Set collective stick (1) to full up.** Rotate grip (2) counterclockwise to lock.

4. **Disconnect AGPU** (para 1-7-16 and 1-7-18).





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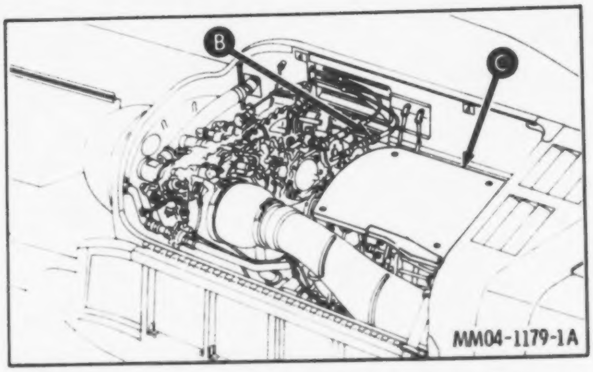
4-8-3. NO. 1 ENGINE LOAD DEMAND SPINDLE GEARBOX REMOVAL/INSTALLATION (cont) 4-8-3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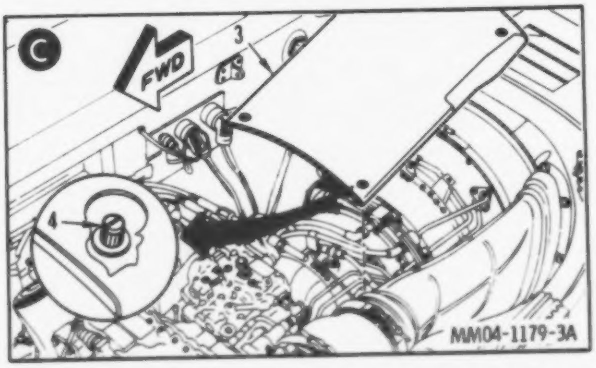
5. **Remove engine shroud (3).** Release four turnlock fasteners (4).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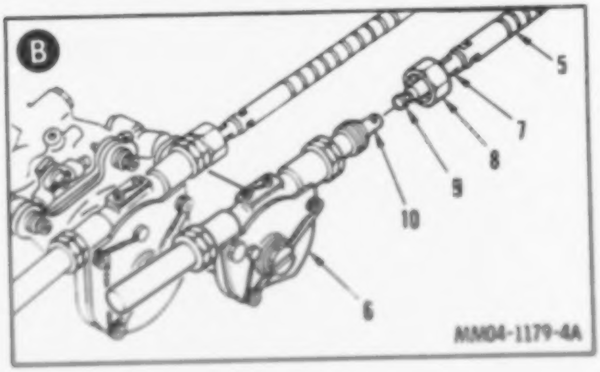
6. **Disconnect cable (5) from load demand spindle gearbox (6).**
   a. Hold cable flats (7).
   b. Remove coupling nut (8).
   c. Disconnect cable fitting (9) from gearbox fitting (10).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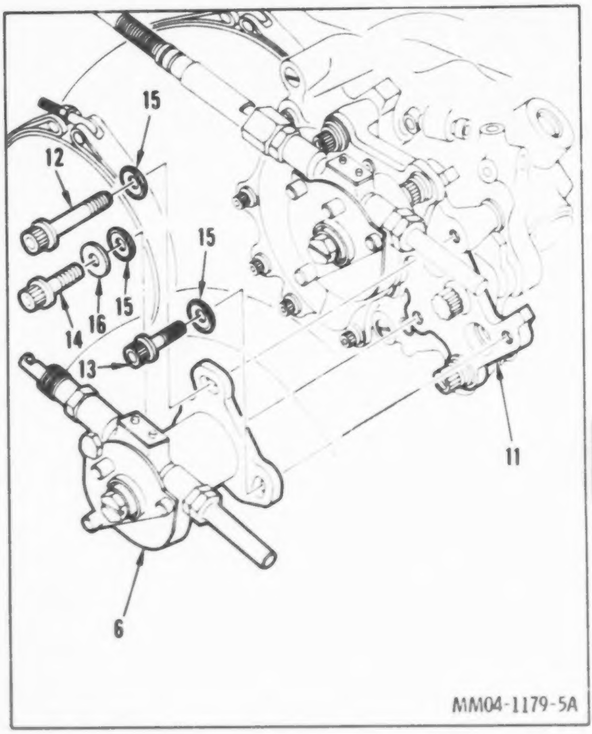
4-8-3. NO. 1 ENGINE LOAD DEMAND SPINDLE GEARBOX REMOVAL/INSTALLATION (cont) 4-8-3

7. **Remove gearbox (6) from baseplate (11).**

   a. Remove three bolts (12), (13), and (14); three countersunk washers (15); and flat washer (16).

   b. Pull gearbox (6) aft from baseplate (11).



B. CLEANING

Clean baseplate (para 1-5-36).

C. INSPECTION

1. **Check cable for cracked, bent, or loose fitting.** None allowed.

2. **Check cable fitting and exposed baseplate for corrosion** (para 1-5-38).

3. **Check baseplate for nicks or scratches.** Maximum depth not to exceed 0.015 INCH.

4. **Check splines for visible nicks or wear.** None allowed.

GO TO NEXT PAGE

4-8-3. NO. 1 ENGINE LOAD DEMAND SPINDLE GEARBOX REMOVAL/INSTALLATIN (cont) 4-8-3

D. INSTALLATION

1. **Install gearbox (6) on baseplate (11).** Torque bolts (12), (13), and (14) to **60 INCH-POUNDS.**

   a. Aline pins (19) and (20) with holes (21) and (22).

   b. Aline hub wide tooth space (17) with spline wide tooth (18). Rotate slot (23) to aline.

   c. Slide hub (24) on spline (25).

   d. Install long bolt (12), bolts (13) and (14), flat washer (16), and three countersunk washers (15).

   e. Torque bolts (12), (13), and (14) to **60 INCH-POUNDS.** Use 5/16 torque adapter

2. **Connect cable (5) to gearbox (6).** Torque coupling nut (8) to **70 INCH-POUNDS.**

   a. Connect cable fitting (9) to gearbox fitting (10).

   b. Install coupling nut (8) on gearbox (6).

   c. Hold cable flats (7).

   d. Torque coupling nut (8) to **70 INCH-POUNDS.**

3. **Install shroud (3). Secure four turnlock fasteners (4).**

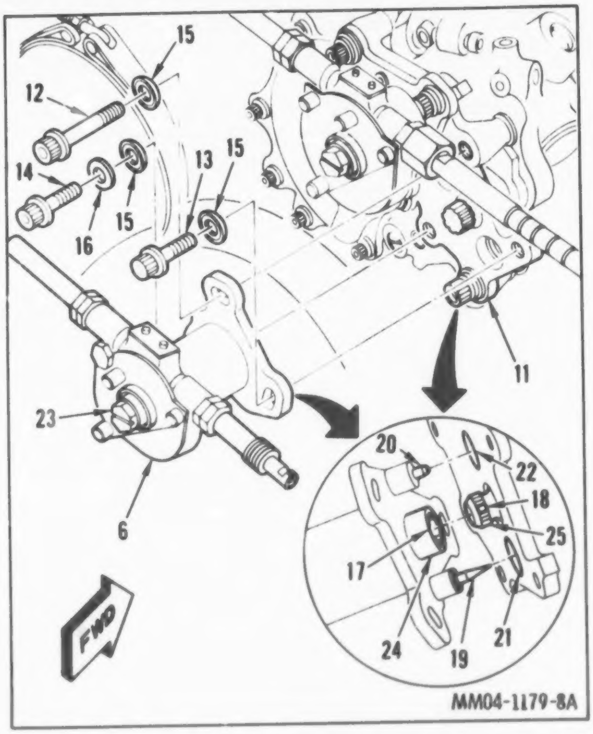
4. **Inspect (TI).**

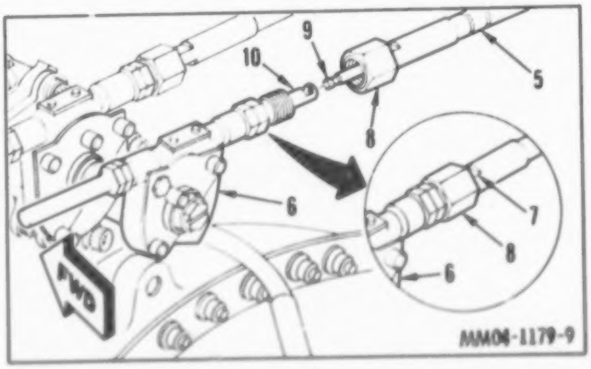
5. **Perform No. 1 engine load demand spindle rigging check (para 4-8-34).**

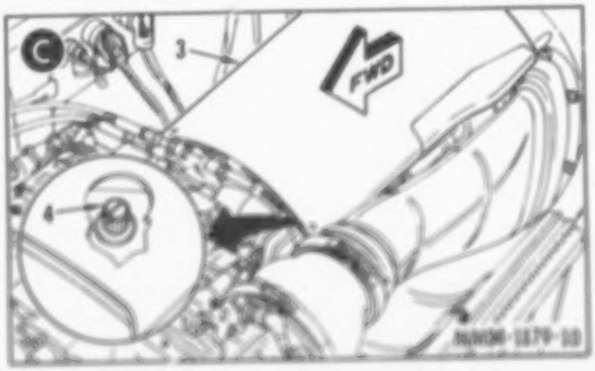
6. **Perform power plant operational check (engine 1) (TM 55-1520-238-T).**

7. **Secure engine work platform door LW1 (para 2-2-2).**

END OF TASK







4-8-4. NO. 2 ENGINE LOAD DEMAND SPINDLE GEARBOX REMOVAL/INSTALLATION 4-8-4

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 3/8 Drive	5120-00-288-8865
Adapter, Torque 5/16, 3/8 Drive	5120-01-074-6573

Personnel Required:

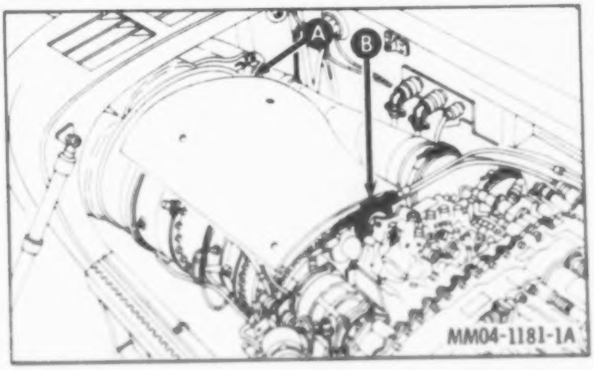
67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access door RN1 opened



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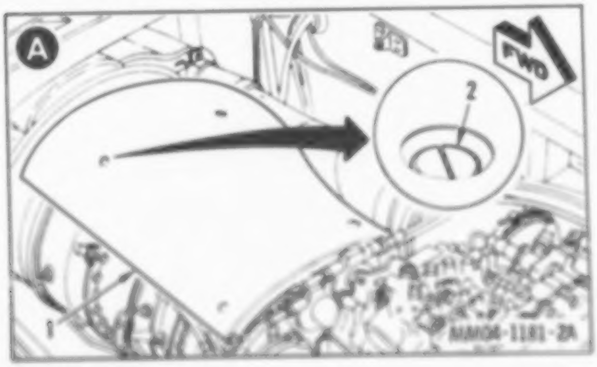
A. REMOVAL

1. **Remove engine shroud (1).** Release four turnlock fasteners (2).



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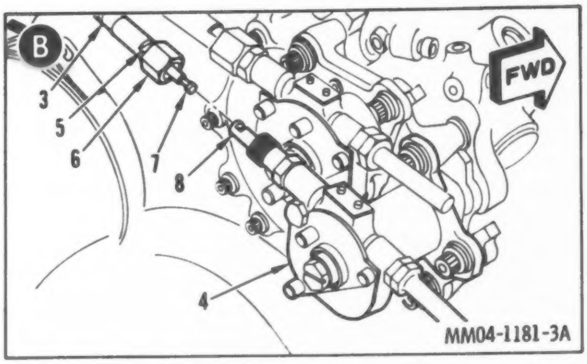
4-8-4. NO. 2 ENGINE LOAD DEMAND SPINDLE GEARBOX REMOVAL/INSTALLATION (cont) 4-8-4

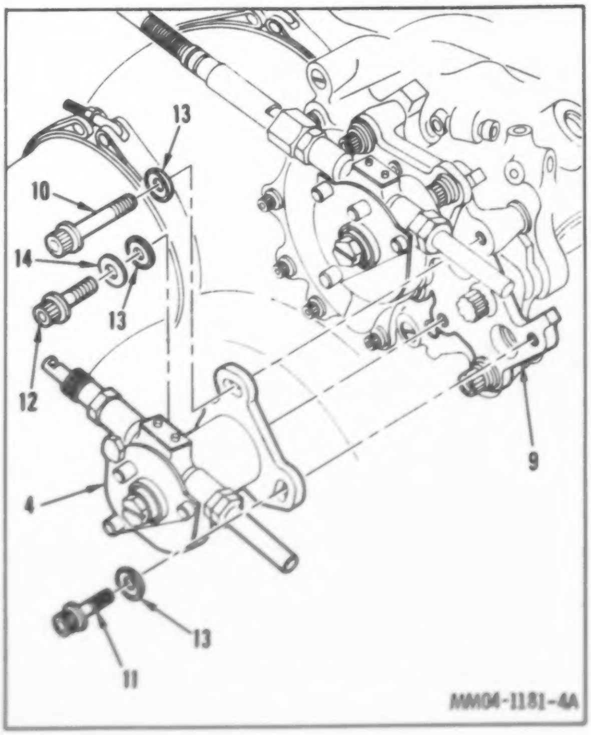


2. **Disconnect cable (3) from load demand spindle gearbox (4).**

   a. Hold cable flats (5).

   b. Remove, coupling nut (6).

   c. Disconnect cable fitting (7) from gearbox fitting (8).



3. **Remove gearbox (4) from baseplate (9).**

   a. Remove three bolts (10), (11), and (12); three countersunk washers (13); and flat washer (14).

   b. Pull gearbox (4) aft from baseplate (9).

B. CLEANING

Clean baseplate (para 1-5-36).

C. INSPECTION

1. **Check cable for cracked, bent, or loose fitting.** None allowed.

2. **Check cable fitting and exposed baseplate for corrosion** (para 1-5-38).

GO TO NEXT PAGE

4-8-4. NO. 2 ENGINE LOAD DEMAND SPINDLE GEARBOX REMOVAL/INSTALLATION (cont) 4-8-4

3. **Check baseplate for nicks and scratches.** Maximum depth not to exceed 0.015 inch.

4. **Check splines for visible nicks or wear.** None allowed.

D. **INSTALLATION**

1. **Install gearbox (4) on baseplate (9).** Torque bolts (10), (11), and (12) to **60 INCH-POUNDS.**

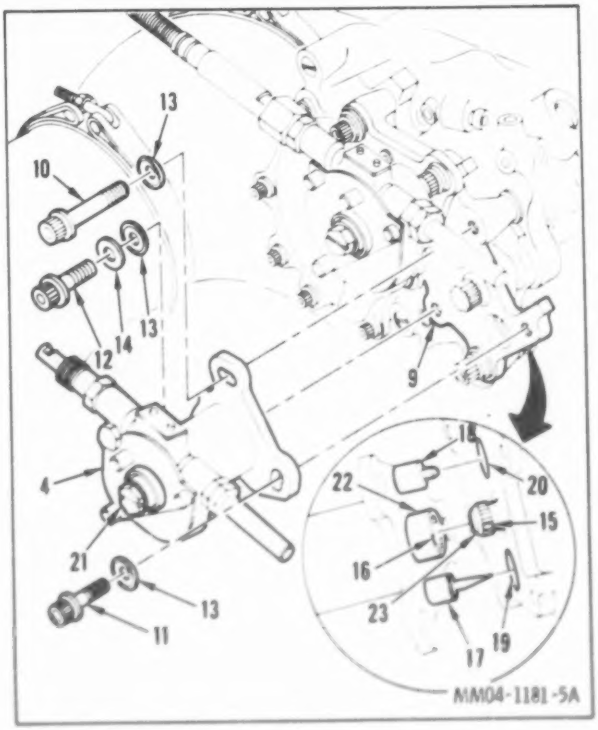
   a. Aline pins (17) and (18) with holes (19) and (20).

   b. Aline hub wide tooth space (15) with spline wide tooth (16). Rotate slot (21) to aline.

   c. Slide hub (22) on spline (23).

   d. Install long bolt (10), bolts (11) and (12), flat washer (14), and three countersunk washers (13).

   e. Torque bolts (10), (11), and (12) to **60 INCH-POUNDS.** Use 5/16 torque adapter.



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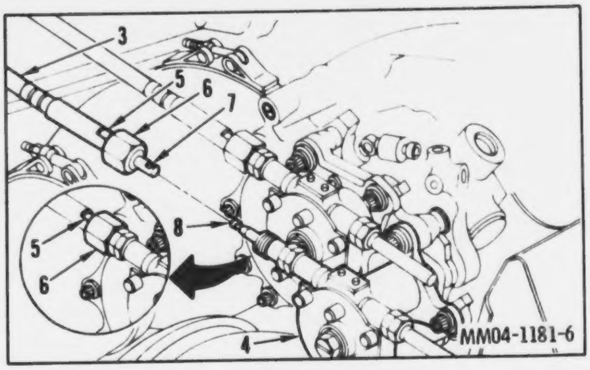
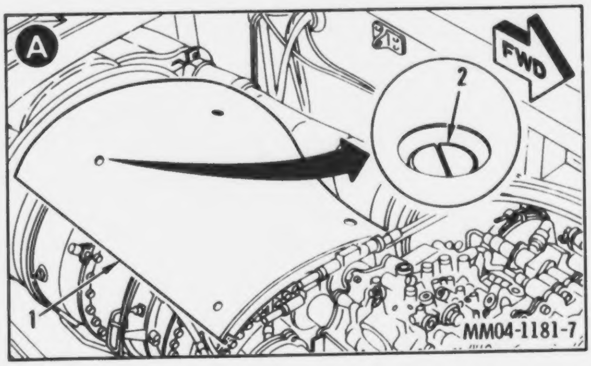
4-8-4. NO. 2. ENGINE LOAD DEMAND SPINDLE GEARBOX REMOVAL/INSTALLATION (cont) 4-8-4

2. **Connect cable (3) to gearbox (4).** Torque coupling nut (6) to **70 INCH-POUNDS.**
   - a. Connect cable fitting (7) to gearbox fitting (8).
   - b. Install coupling nut (6).
   - c. Hold cable flats (5).
   - d. Torque coupling nut (6) to **70 INCH-POUNDS.**
3. **Install engine shroud (1).** Secure four turnlock fasteners (2).
4. **Inspect (TI).**
5. **Perform No. 2 engine load demand spindle rigging check** (para 4-8-34).
6. **Perform power plant operational check (engine 2)** (TM 55-1520-238-T).
7. **Secure engine work platform door RN1** (para 2-2-2).





END OF TASK

4-8-5. ENGINE TURBINE SPEED CONTROL UNIT REPLACEMENT 4-8-5

This task covers: A. REMOVAL B. INSPECTION C. INSTALLATION

Tools:

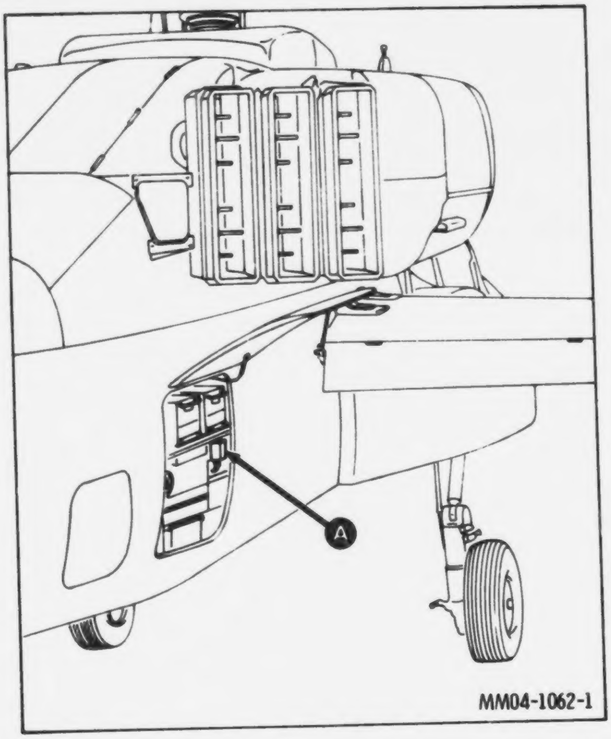
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access door R295 opened

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor



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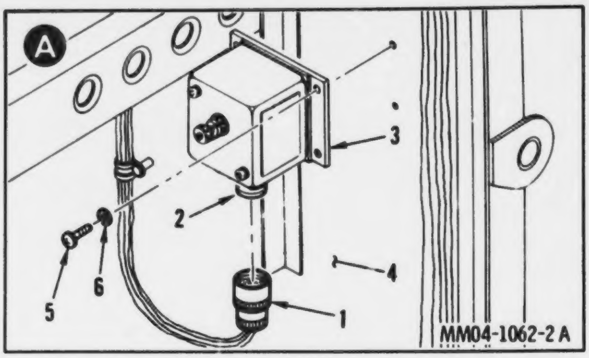
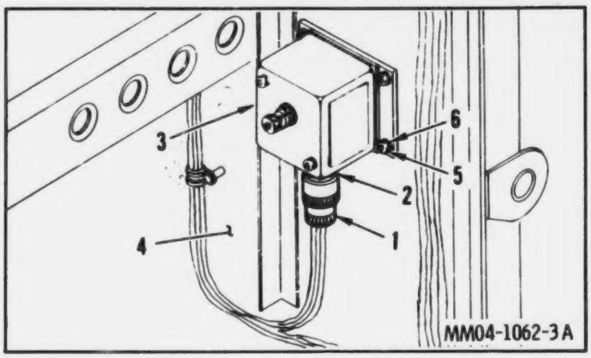
4-8-5. ENGINE TURBINE SPEED CONTROL UNIT REPLACEMENT (cont) 4-8-5





A. REMOVAL

1. **Detach connector P54 (1) from speed control connector J1 (2).**
2. **Remove speed control unit (3) from electronics bay forward bulkhead (4).** Remove four screws (5) and washers (6).

B. INSPECTION

1. **Check speed control mounting area for cracks.** None allowed.
2. **Check connector P54 for bent or missing pins** (TM 55-1500-323-25).

C. INSTALLATION

1. **Install speed control unit (3) on electronics bay bulkhead (4).** Install four screws (5) with washers (6).
2. **Attach connector P54 (1) to speed control connector J1 (2).**
3. **Inspect (TI).**
4. **Adjust speed control unit** (para 4-8-6). **Observe all safety precautions.**
5. **Secure access door R295** (para 2-2-2).

END OF TASK

4-8-6. ENGINE TURBINE SPEED CONTROL UNIT ADJUSTMENT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powerplant Repairer's	5180-00-323-4944

Materials/Parts:

(E34) Lockwire

Personnel Required:

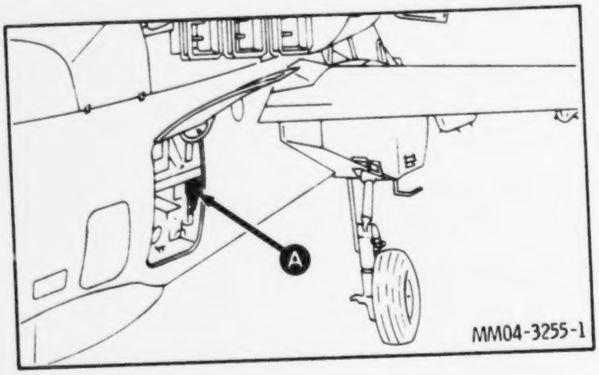
68B10	Aircraft Powerplant Repairer
66R30	Inspector/Supervisor
100KG	Pilot

References:

TM 55-1520-238-CL

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access door R295 opened
TM 55-1520-238-CL	Engines No. 1 and No. 2 running



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4-8-6. ENGINE TURBINE SPEED CONTROL UNIT ADJUSTMENT (cont) 4-8-6

1. Remove lockwire.

2. **While holding Np adjustment screw (1), loosen nut (2) on turbine speed control (3).**

CAUTION

Np adjustment unit is very sensitive. To prevent damage to power plants, adjustments shall be made very slowly at pilot's direction.

NOTE

Turn adjustment screw clockwise to increase Np adjustment. to decrease Np adjustment, turn adjustment screw counterclockwise

3. **Slowly adjust Np adjustment screw (1) on turbine speed control (3) as required to obtain 100% Np.**

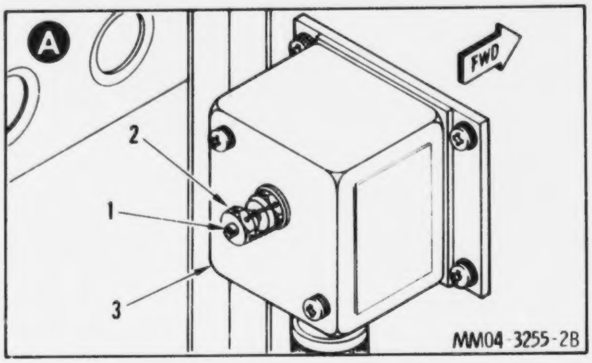
4. **Hold Np adjustment screw (1). Tighten nut (2).**

5. **Lockwire nut (2).** Use lockwire (E34).

6. **Inspect (TI).**

7. **If maintenance test flight is not required, shut down engines** (TM 55-1520-238-10).

8. **Secure access door R295** (para 2-2-2).



END OF TASK

4-8-7. EMERGENCY POWER CHECK PANEL REMOVAL/INSTALLATION 4-8-7

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

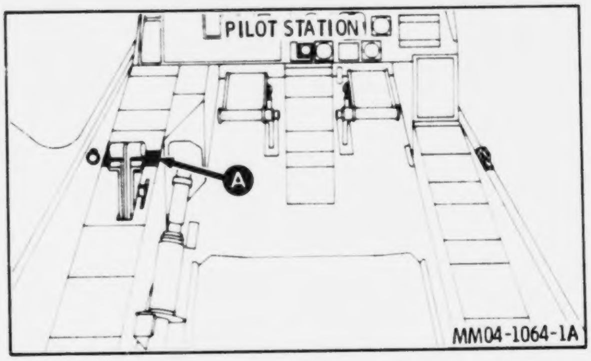
67R10 Attack Helicopter Repairer
66R30 Inspector/Supervisor

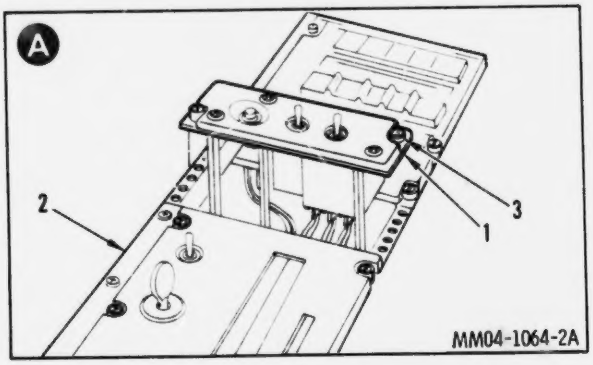
References:

TM 55-1520-238-T
TM 55-1500-323-24

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed





A. REMOVAL

1. **Enter pilot station (para 1-7-1). Observe all safety precautions.**

2. **Open ENG START circuit breaker on pilot forward circuit breaker panel.**

3. **Open LT PRI circuit breaker on pilot center circuit breaker panel.**

4. **Remove emergency power check panel (1) from left console (2).**

   a. Unlock two Camloc fasteners (3).

   b. Lift check panel (1) from console (2).

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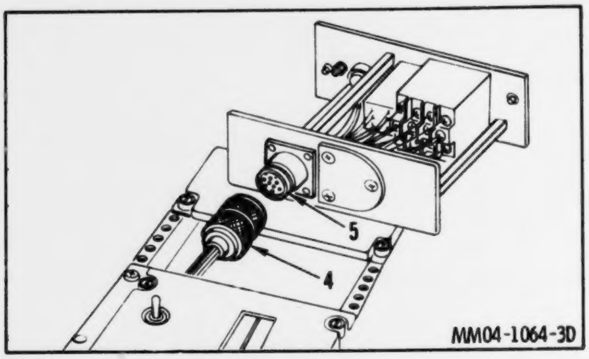
4-8-7. EMERGENCY POWER CHECK PANEL REMOVAL/INSTALLATION (cont) 4-8-7

5. Detach connector P175 (4) from panel connector J1 (5).



B. CLEANING

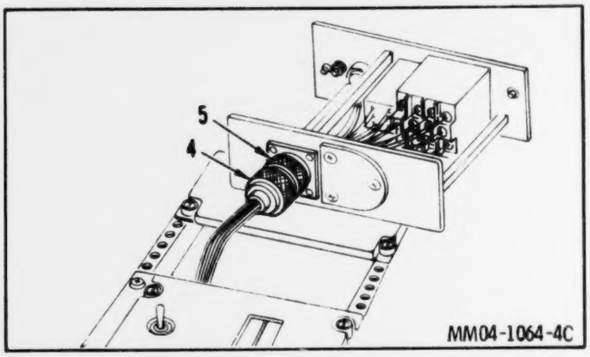
Clean all removed and attaching parts with clean rag.

C. INSPECTION

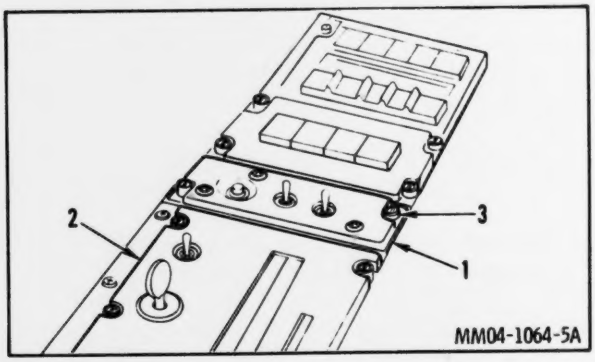
1. Check panel for cracks. None allowed.
2. Check panel for corrosion (para 1-5-36).
3. Check connectors P175 and J1 for damage (TM 55-1500-323-24).

D. INSTALLATION

1. Attach connector P175 (4) to panel connector J1 (5).



2. Install check panel (1) in left console (2). Lock two Camloc fasteners (3).
3. Inspect (TI).
4. Perform power plant operational check (engine 1) (TM 55-1520-238-T).



END OF TASK

4-8-8. NO. 1 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE REMOVAL 4-8-8

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

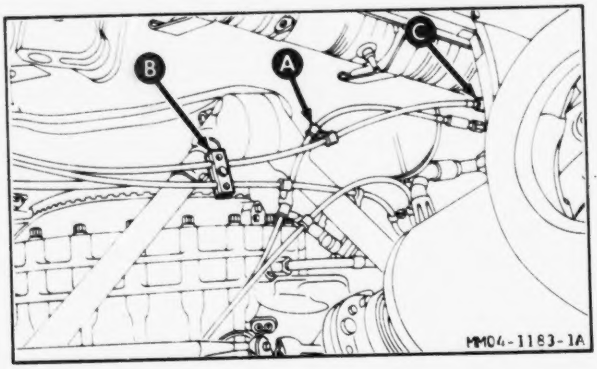
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R10 Attach Helicopter Repairer

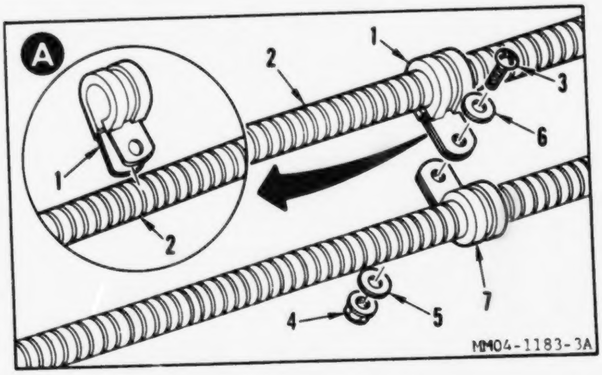
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access panels L200 and L160 removed and console panels PL1 and PL3 removed
9-5-5	Transformer-rectifier No. 1 removed
4-8-12	No. 1 or No. 2 engine load demand spindle forward cable removed
10-2-94	Pilot fuel panel removed
9-6-9	Pilot interior/exterior lights panel removed



A. REMOVAL

1. **Remove clamp (1) from center cable (2).**
    a. Hold screw (3).
    b. Remove nut (4) and washer (5).
    c. Remove screw (3) and washer (6) from clamps (1) and (7).



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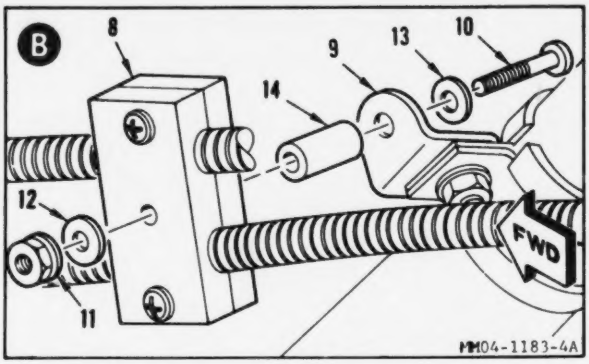
4-8-8. NO. 1 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE REMOVAL (cont) 4-8-8

2. Remove clamp (8) from bracket (9).

a. Hold screw (10).

b. Remove nut (11) and washer (12).

c. Remove screw (10), washer (13), and spacer (14).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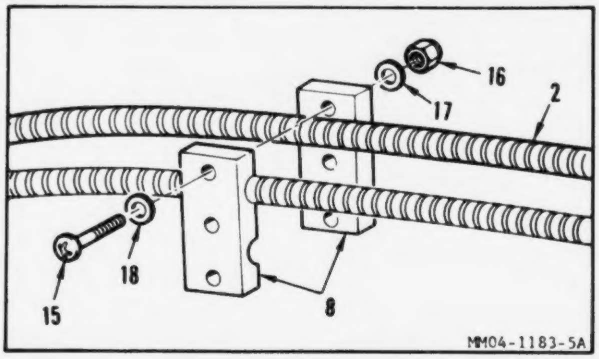
3. Remove clamp (8) from center cable (2).

a. Hold two screws (15).

b. Remove two nuts (16) and washers (17).

c. Remove two screws (15) and washers (18) from clamp (8).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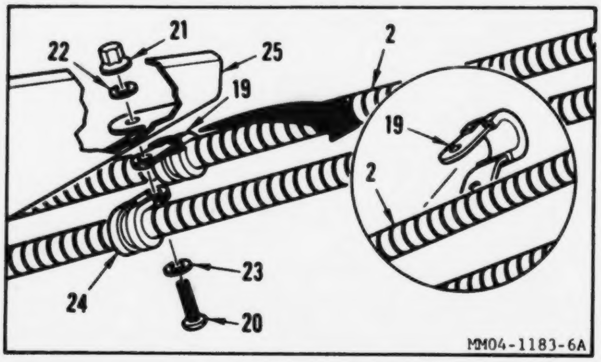
4. Remove clamp (19) from center cable (2).

a. Hold screw (20).

b. Remove nut (21) and washer (22).

c. Remove screw (20), washer (23), clamps (19) and (24); from bracket (25).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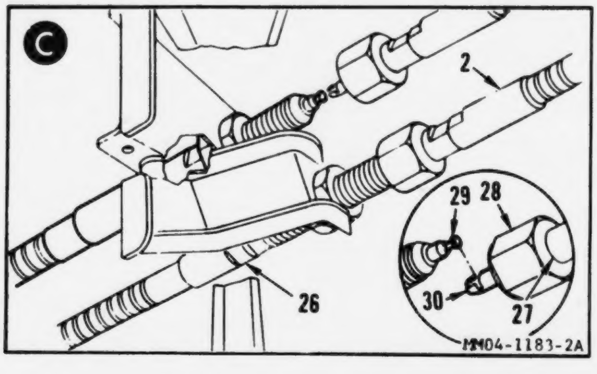
5. Remove center cable (2) from aft cable (26).

a. Hold cable (2) at wrench flats (27).

b. Remove coupling nut (28) from cable (26).

c. Remove cable (26) connector (29) from cable (2) connector (30).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4-8-8. NO. 1 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE REMOVAL (cont) 4-8-8

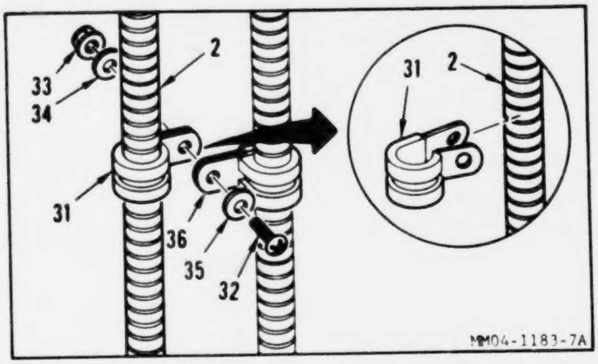
6. **Remove clamp (31) from center cable (2).**

   a. Hold screw (32).

   b. Remove nut (33) and washer (34).

   c. Remove screw (32), and washer (35) from clamps (31) and (36).

   d. Remove clamp (31) from cable (2).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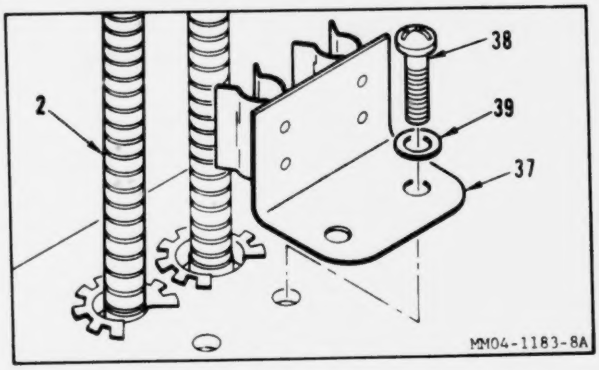
7. **Remove bracket (37) from center cable (2).**

   a. Remove two screws (38) and washers (39).

   b. Remove bracket (37).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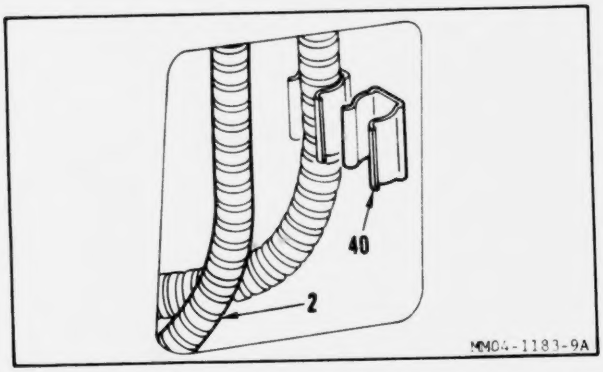
8. **Remove center cable (2) from clip (40).**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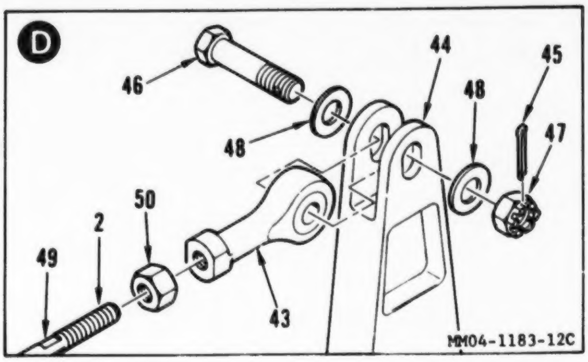
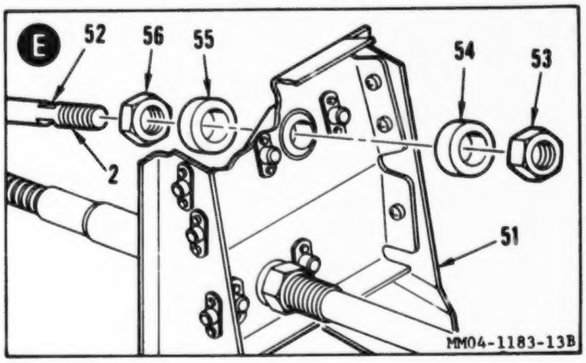
4-8-8. NO. 1 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE REMOVAL (cont) 4-8-8

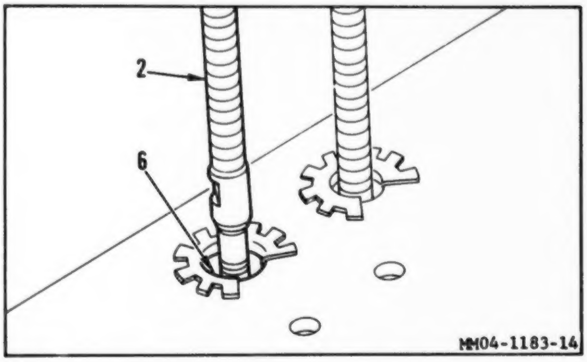

D
46
44
45
48
48
47
50
2
49
43
MM04-1183-12C

9. **Remove rod end (43) from bellcrank (44).**
   a. Remove cotter pin (45).
   b. Hold bolt (46).
   c. Remove nut (47) and washer (48).
   d. Remove bolt (46) and washer (48) from bellcrank (44).


E
52
56
55
54
53
2
51
MM04-1183-13B

10. **Remove rod end (43) from center cable (2).**
   a. Hold cable (2) at wrench flats (49).
   b. Loosen nut (50).
   c. Remove rod end (43) and nut (50) from cable (2).

11. **Remove center cable (2) from bracket (51).**
   a. Hold cable (2) at wrench flats (52).
   b. Remove nut (53) and spacer (54) from cable (2).
   c. Pull cable (2) aft until free of bracket (51).
   d. Remove spacer (55) and nut (56).


2
6
MM04-1183-14

12. **Remove center cable (2) from helicopter through transmission deck access L200.**

GO TO NEXT PAGE

4-8-8. NO. 1 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE REMOVAL (cont) 4-8-8

B. CLEANING

Clean rod end, cable support, and support bracket (para 1-5-36).

C. INSPECTION

1. Check rod end for thread damage and bearing surface scars.
   None allowed.

2. Check cable support, and support bracket for cracks.
   None allowed.

3. Check rod end cable support, and support bracket for corrosion (para 1-5-38).

END OF TASK

4-8-9. NO. 1 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE INSTALLATION 4-8-9

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 3/8 Drive	5120-00-288-8865
Wrench, Torque, 3/8 Drive	5120-00-117-4832
Rigging Kit, Control Systems	1730-01-181-9270
Scale, Dial Indicating	6670-00-240-5821
Crowfoot Attachment 7/8, 3/8 Drive	5180-00-181-6765

Materials/Parts:

Cotter Pin

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

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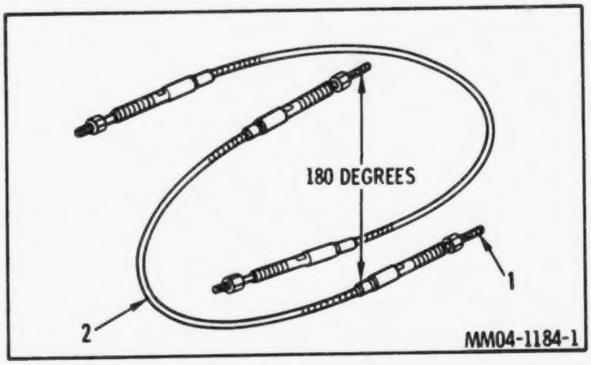
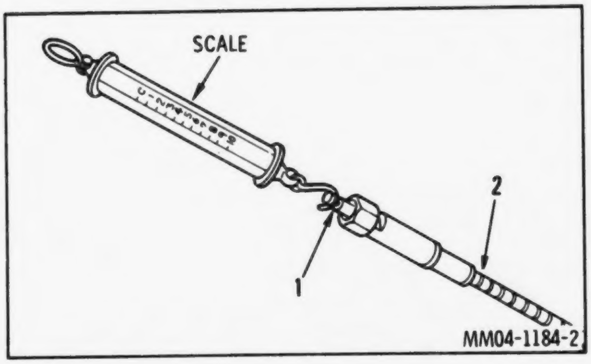
1. **Check center cable ribbon (1) for movement.** Do not install cable if ribbon (1) moves during check.
   a. Bend cable (2) **180 DEGREES** in one direction. Ribbon (1) should not move.
   b. Bend cable (2) **180 DEGREES** in opposite direction. Ribbon (1) should not move.



2. **Check center cable ribbon (1) friction load.** Do not install cable (2) if friction load exceeds **1-1/2 POUNDS.**
   a. Place cable (2) on flat work surface.
   b. Make sure cable (2) is straight and not twisted.
   c. Attach dial-indicating scale to end of ribbon (1) and check load. If friction load exceeds **1-1/2 POUNDS,** do not install cable (2).



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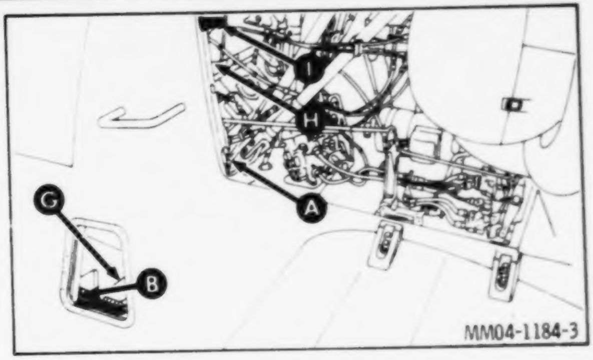
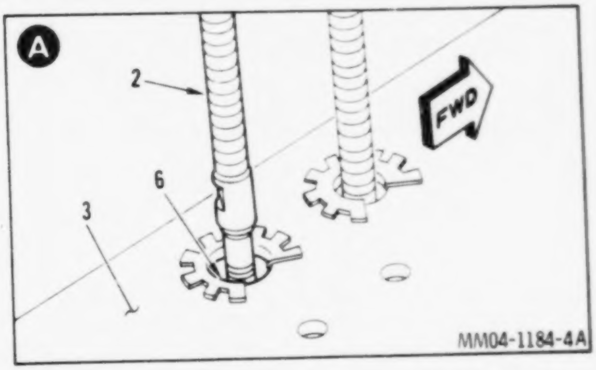
4-8-9. NO. 1 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE INSTALLATION



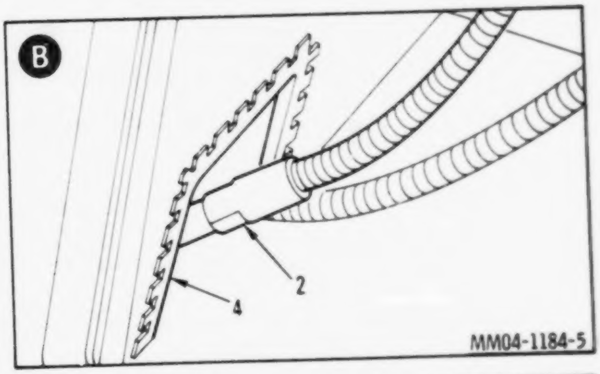
MM04-1184-3

3. Route center cable (2) from transmission deck to pilot station.
4. Guide threaded end of cable (2) through hole (6) in transmission deck(3).



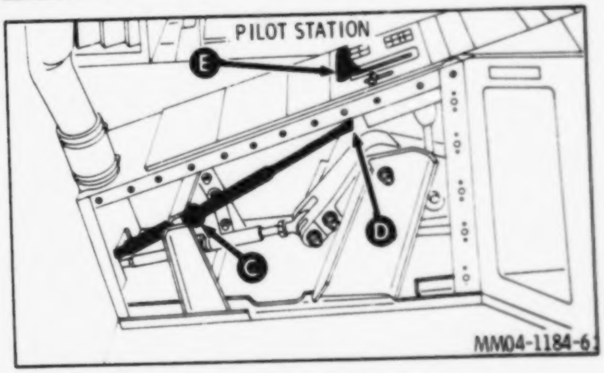
MM04-1184-4A

5. Guide cable (2) through hole (4) in pilot station bulkhead.



MM04-1184-5

6. Enter pilot station (para 1-7-1). Observe all safety precautions.



MM04-1184-6

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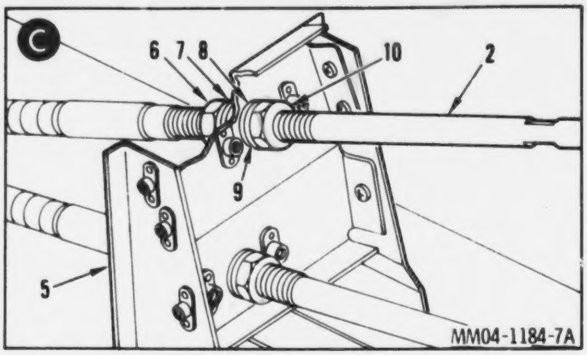
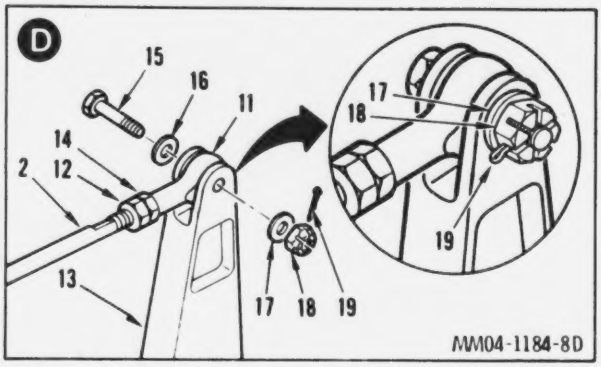
4-8-9. NO. 1 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE INSTALLATION (cont) 4-8-9



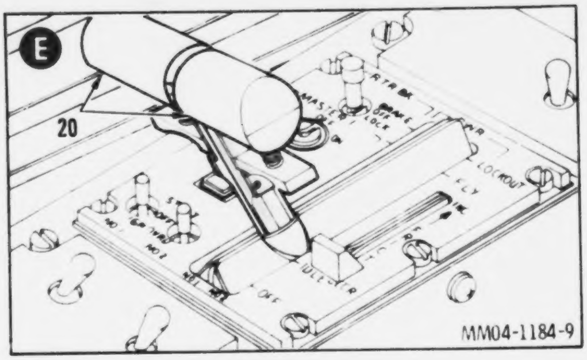


7. **Install center cable (2) on bracket (5).**
   - a. Center nut (6) on threaded area of cable (2).
   - b. Install spacer (7) on cable (2).
   - c. Slide cable (2) through bearing (8) on bracket (5).
   - d. Install spacer (9) on cable (2).
   - e. Install nut (10) on cable (2) and tighten until spacer (9) contacts bearing (8).
8. **Install rod end (11) on cable (2).**
   - a. Install nut (12) on cable (2) so **1/2-INCH** of threaded cable end is exposed.
   - b. Install rod end (11) **1/2-INCH** onto cable (2) and aline with bellcrank (13).
9. **Torque nut (12) to 20 INCH-POUNDS.**
   - a. Hold rod end (11) at wrench flats (14).
   - b. Torque nut (12) to **20 INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 inch-pounds).
10. **Connect rod end (11) to bellcrank (13).**
    - a. Insert bolt (15) through washer (16), bellcrank (13), and rod end (11).
    - b. Install serrated washer (17) and nut (18) on bolt (15).
11. **Torque nut (18) 14 to 18 INCH-POUNDS and install cotter pin (19).**
    - a. Hold bolt (15) and install nut (18).
    - b. Torque nut (18) to **14 INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 inch-pounds).
    - c. **Increase torque to aline cotter pin holes, but do not exceed 18 INCH-POUNDS.**
    - d. Install new cotter pin (19).

GO TO NEXT PAGE

4-8-9. NO. 1 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE INSTALLATION (cont) 4-8-9

12. **Put pilot power levers (2) in IDLE position.**

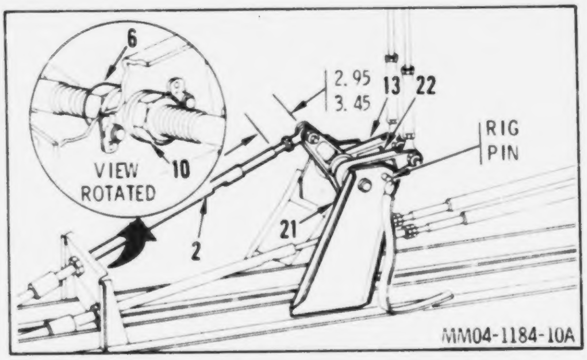

E
20
MASTER LOCK
LOCKOUT
FLY
IDLE
OFF
MM04-1184-9

13. **Adjust center cable (2) travel from 2.95 to 3.45 INCHES.**

    a. Insert rig pin through bracket (21) and bellcranks (13) (22).

    b. Adjust nuts (6) and (10) to get correct travel.

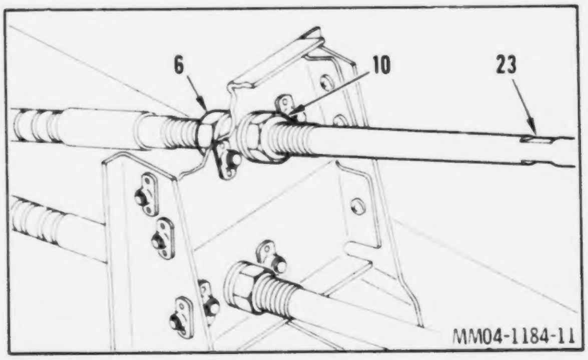
    c. Tighten nuts (6) and (10).


6
VIEW ROTATED
10
2.95
3.45
13
22
RIG PIN
21
2
MM04-1184-10A

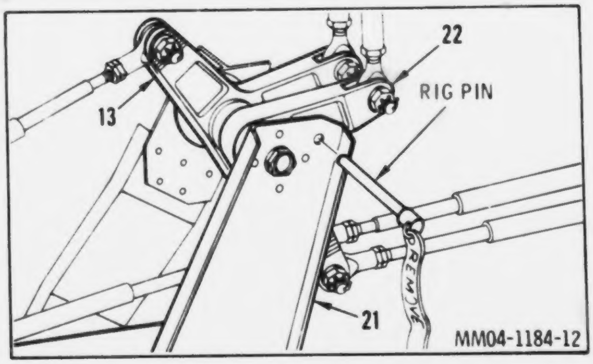
14. **Torque nuts (6) and (10) to 90 INCH-POUNDS.**

    a. Hold cable (2) at wrench flats (23).

    b. Torque nuts (6) and (10) to **90 INCH-POUNDS.** Use 1/4 drive torque wrench (30 to 150 inch-pounds).


6
10
23
MM04-1184-11

15. **Remove rig pin from bracket (21) and bellcranks (13) and (22).**


22
RIG PIN
13
REMOVE
21
MM04-1184-12

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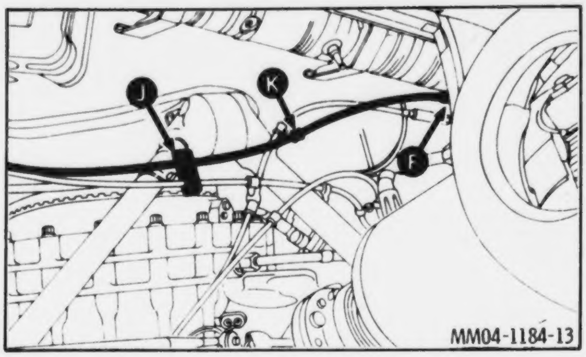
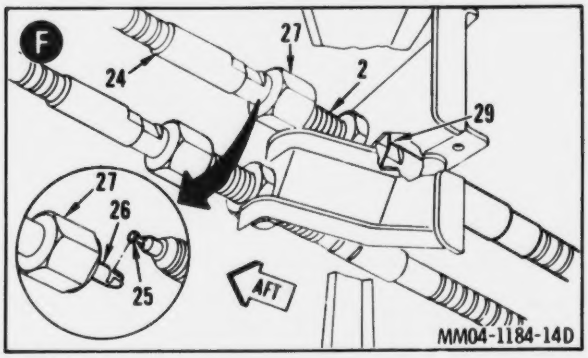
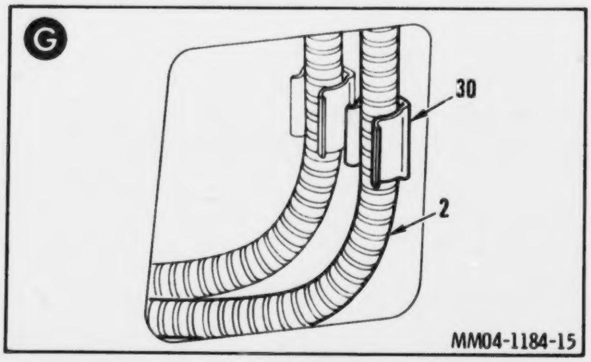
4-8-9. NO. 1 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE INSTALLATION (cont) 4-8-9


J
K
F
MM04-1184-13

16. **Connect center cable (2) to aft cable (24).**
    a. Connect cable (2) male connector (25) to cable (24) female connector (26).
    b. Install coupling nut (27) on cable (2).
17. **Torque coupling nut (27) to 70 INCH-POUNDS.**
    a. Hold cable (2) at wrench flats (29).
    b. Torque nut (27) to **70 INCH-POUNDS.** Use 1/4 drive torque wrench (30 - 150 inch-pounds).


F
24
27
2
29
27
26
25
AFT
MM04-1184-14D

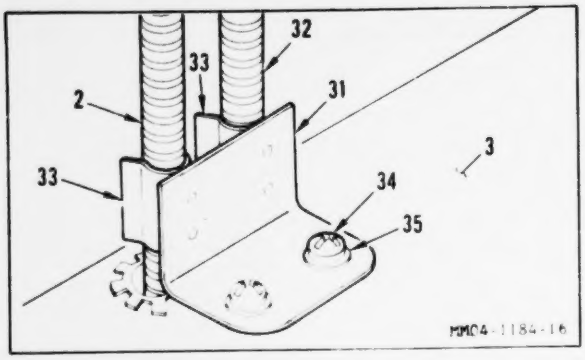
18. **Insert center cable (2) into clip (30).**


G
30
2
MM04-1184-15

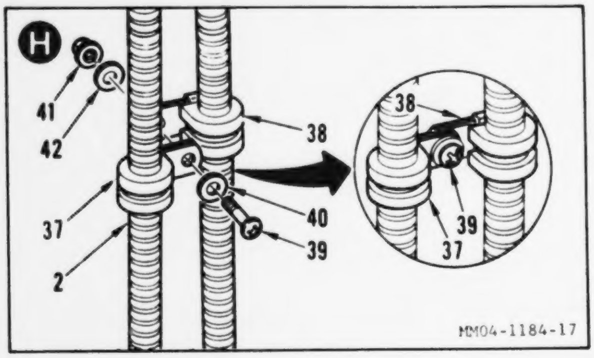
GO TO NEXT PAGE

4-8-9. NO. 1 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE INSTALLATION (cont) 4-8-9

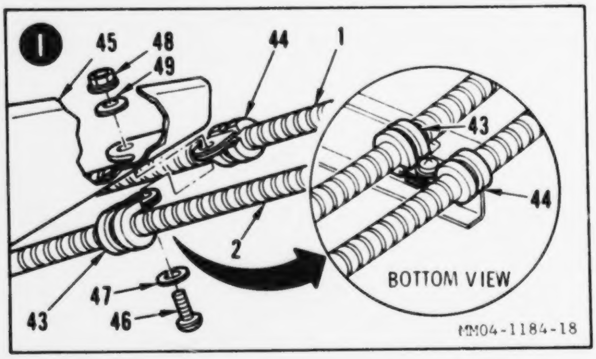
19. **Install bracket (31) on transmission deck (3).**
    - a. Insert center cable (2) and cable (32) in clip (33).
    - b. Install two washers (35) and screws (34)


32
33
2
31
3
33
34
35
MM04-1184-16

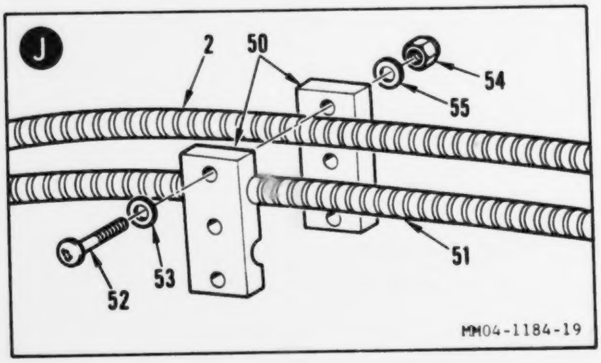
20. **Connect clamp (37) to clamp (38).**
    - a. Position clamp (37) on center cable (2).
    - b. Insert screw (39) through washer (40) in clamps (37) and (38).
    - c. Hold screw (39).
    - d. Install washer (42), and nut (41).


H
41
42
38
37
40
39
2
38
39
37
MM04-1184-17

21. **Install clamps (43) and (44) on bracket (45).**
    - a. Position clamp (43) on center cable (2).
    - b. Insert screw (46) through washer (47) into clamps (43) and (44) and bracket (45).
    - c. Hold screw (46).
    - d. Install washer (49) and nut (48).


I
45
48
49
44
1
43
44
2
BOTTOM VIEW
47
43
46
MM04-1184-18

22. **Install clamp (50) on center cable (2) and cable (51).**
    - a. Put clamp (50) on cables (2) and (51).
    - b. Insert two screws (52) through washers (53) in clamp (50).
    - c. Hold screws (52).
    - d. Install two washers (55) and two nuts (54).


J
2
50
54
55
51
52
53
MM04-1184-19

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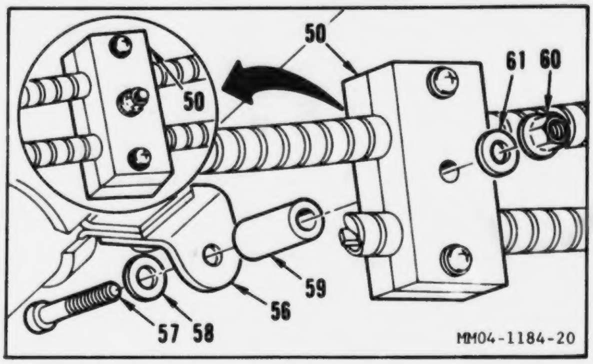
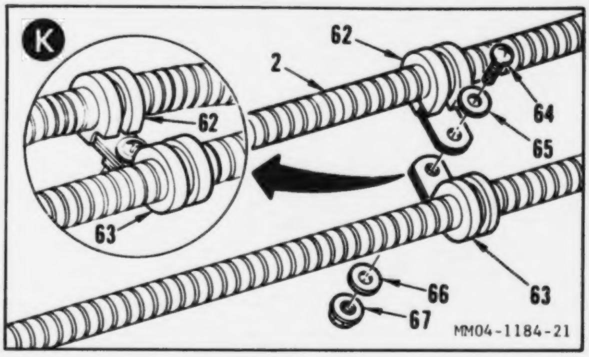
4-8-9. NO. 1 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE INSTALLATION (cont) 4-8-9

23. **Install clamp (50) on bracket (56).**
    a. Insert screw (57) through washer (58), bracket (56), spacer (59), and clamp (50).
    b. Hold screw (57).
    c. Install washer (61) and nut (60).



24. **Connect clamp (62) to clamp (63).**
    a. Put clamp (62) on center cable (2).
    b. Install screw (64) through washer (65) in clamps (62) and (63).
    c. Hold screw (64).
    d. Install washer (66) and nut (67).



25. **Install No. 1 engine load demand spindle cable** (para 4-8-12).
26. **Perform No. 1 and No. 2 load demand spindle rigging** (para 4-8-35).
27. **Install transformer-rectifier No. 1** (para 9-5-5).
28. **Install pilot fuel control panel** (para 10-2-94).
29. **Install pilot interior/exterior lights panel** (para 9-6-9).
30. **Secure access panels L200 and L160** (para 2-2-2).
31. **Install pilot left console panels PL1 and PL3** (para 2-2-7).
32. **Inspect (TI).**
33. **Perform power plant operational check (engine 1)** (TM 55-1520-238-T).

END OF TASK

4-8-10. NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE REMOVAL 4-8-10

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

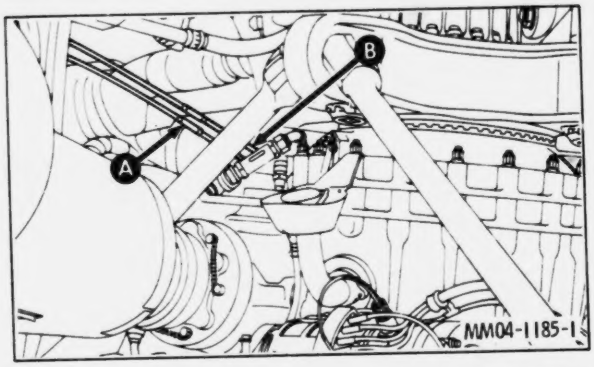
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

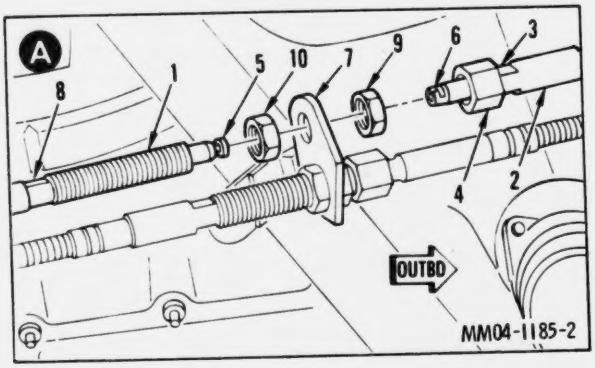
Personnel Required:

67R10 Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform panels L20, R20, L160 removed and console panels PL1 and PL3 removed
9-5-6	Transformer-rectifier No. 2 removed





A. REMOVAL

1. **Disconnect center cable (1) from aft cable (2).**
   - a. Hold aft cable (2) at wrench flats (3).
   - b. Remove coupling nut (4) from cable (1).
   - c. Disconnect male connector (5) from female connector (6).
2. **Remove center cable (1) from bracket (7).**
   - a. Hold cable (1) at wrench flats (8).
   - b. Remove nut (9) from cable (1).
   - c. Remove nut (10) from cable (1).

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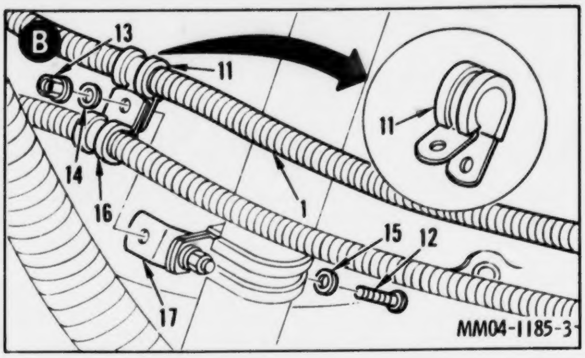
4-8-10. NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE REMOVAL (cont)


B
13
11
11
14
16
1
15
12
17
MM04-1185-3

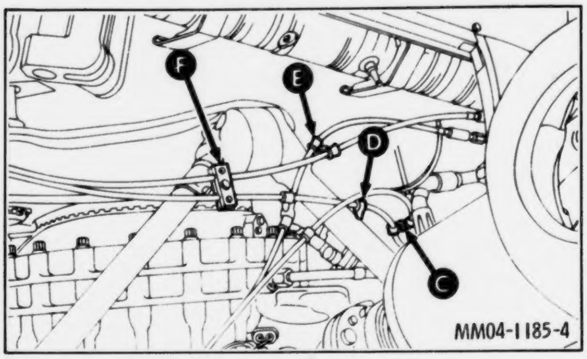
3. **Remove clamp (11) from center cable (1).**

    a. Hold screw (12).

    b. Remove nut (13) and washer (14).

    c. Remove screw (12) and washer (15) from clamps (11) and (16) and bracket (17).

    d. Remove clamp (11).


F
E
D
C
MM04-1185-4

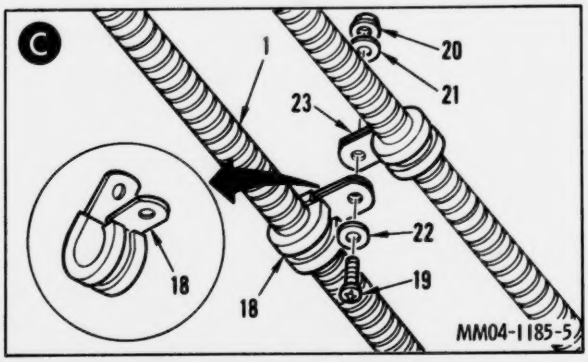
4. **Remove clamp (18) from center cable (1).**

    a. Hold screw (19).

    b. Remove nut (20) and washer (21).

    c. Remove screw (19) and washer (22) from clamps (18) and (23).

    d. Remove clamp (18).


C
1
20
21
23
22
19
18
18
MM04-1185-5

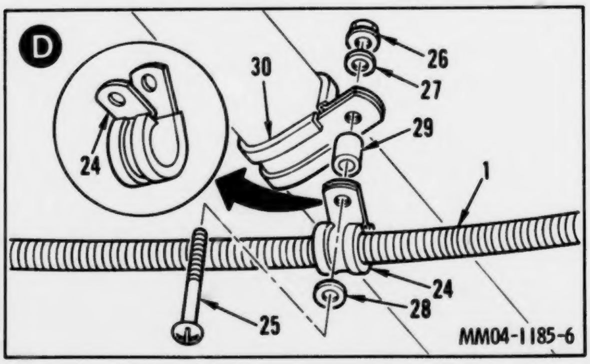
5. **Remove clamp (24) from center cable (1).**

    a. Hold screw (25).

    b. Remove nut (26) and washer (27).

    c. Remove screw (25) and washer (28) from clamp (24), spacer (29), and clamp (30).

    d. Remove clamp (24).


D
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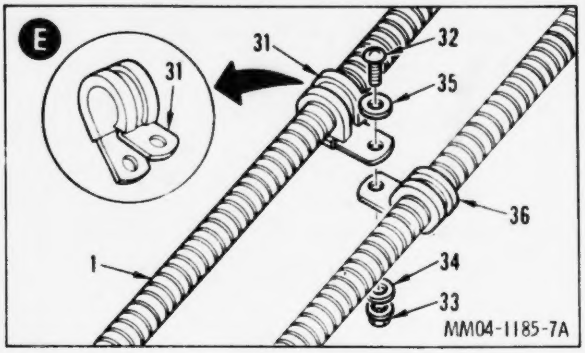
26
27
29
24
1
24
28
25
MM04-1185-6

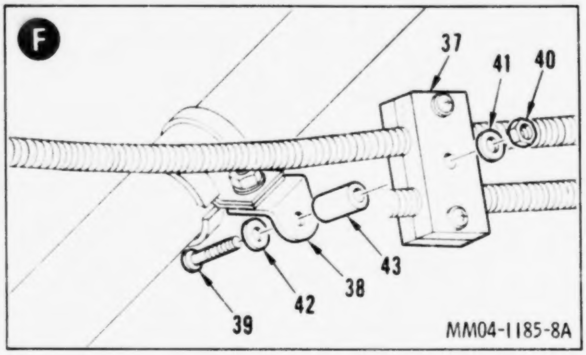
GO TO NEXT PAGE

4-8-10. NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE REMOVAL (cont) 4-8-10

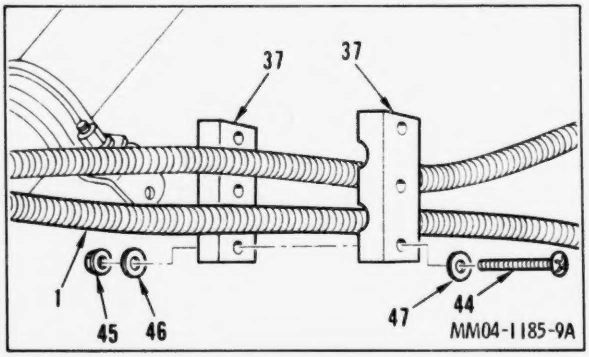
6. **Remove clamp (31) from center cable (1).**
   a. Hold screw (32).
   b. Remove nut (33) and washer (34).
   c. Remove screw (32) and washer (35) from clamps (31) and (36).
   d. Remove clamp (31).

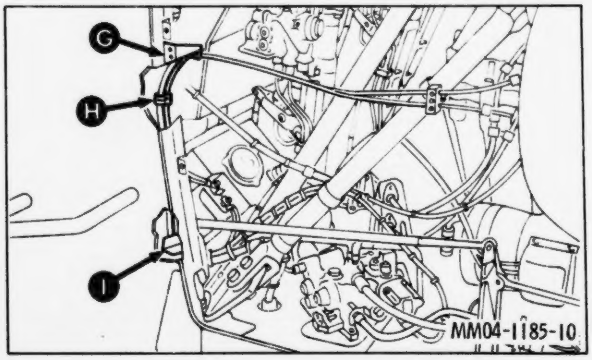

E
31
31
32
35
36
1
34
33
MM04-1185-7A

7. **Remove clamp (37) from bracket (38).**
   a. Hold screw (39).
   b. Remove nut (40) and washer (41).
   c. Remove screw (39), washer (42), and spacer (43) from bracket (38).


F
37
41
40
43
38
42
39
MM04-1185-8A

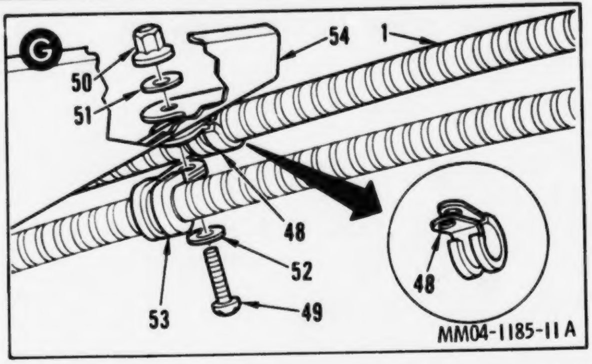
8. **Remove clamp (37) from center cable (1).**
   a. Hold two screws (44).
   b. Remove two nuts (45) and washers (46).
   c. Remove two screws (44) and washers (47) from clamp (37).


37
37
1
45
46
47
44
MM04-1185-9A

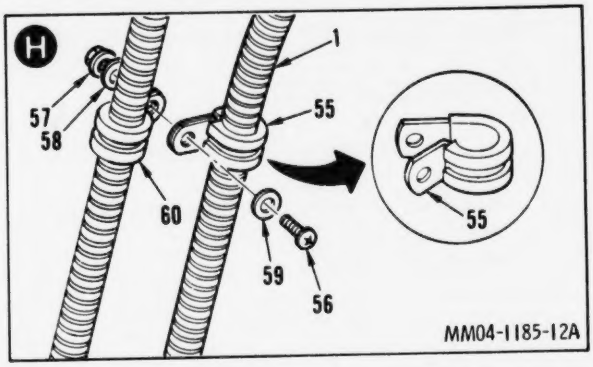

G
H
I
MM04-1185-10

4-8-10. NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE REMOVAL (cont) 4-8-10

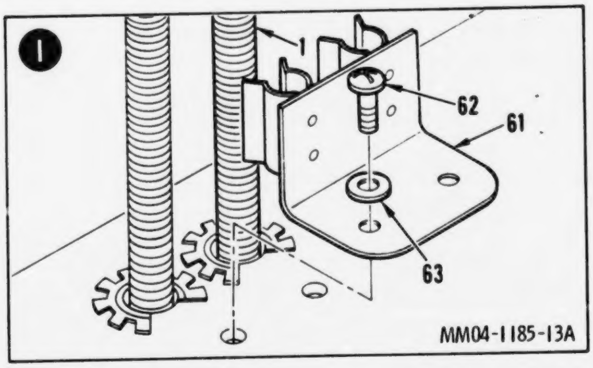
9. **Remove clamp (48) from center cable (1).**
   a. Hold screw (49).
   b. Remove nut (50) and washer (51).
   c. Remove screw (49) and washer (52) from clamps (48) and (53) and bracket (54).
   d. Remove clamp (48).

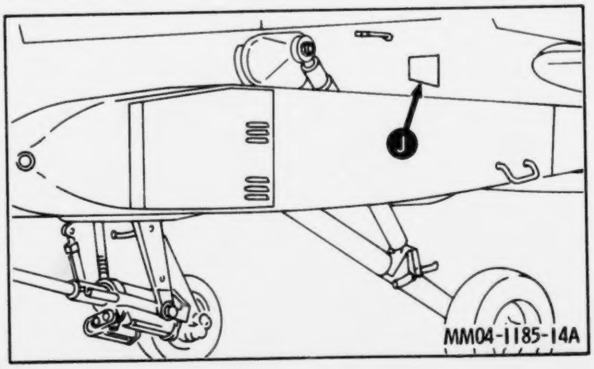

G
50
51
54
1
48
52
53
49
48
MM04-1185-11 A

10. **Remove clamp (55) from center cable (1).**
    a. Hold screw (56).
    b. Remove nut (57) and washer (58).
    c. Remove screw (56) and washer (59) from clamps (55) and (60).
    d. Remove clamp (55).


H
57
58
1
55
60
59
56
55
MM04-1185-12A

11. **Remove bracket (61) from center cable (1).**
    a. Remove two screws (62) and two washers (63).
    b. Remove bracket (61).


I
1
62
61
63
MM04-1185-13A


J
MM04-1185-14A

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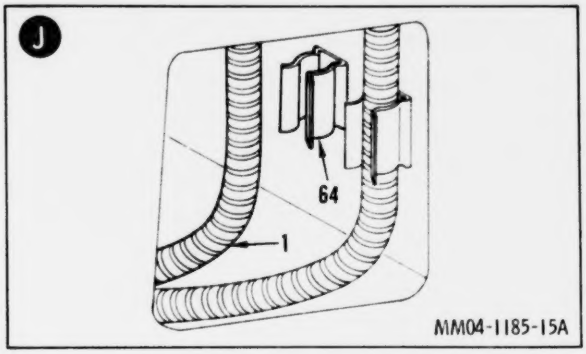
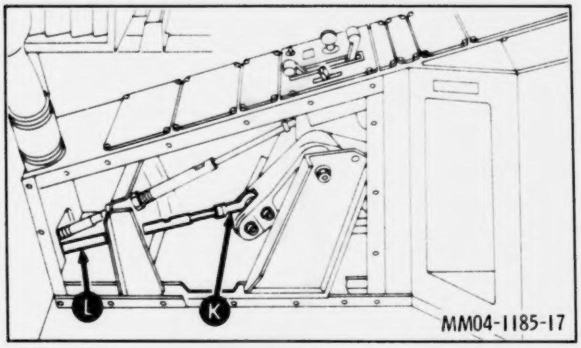
4-8-10. NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE REMOVAL (cont) 4-8-10

12. Remove center cable (1) from clip (64).


J
64
1
MM04-1185-15A


L
K
MM04-1185-17

GO TO NEXT PAGE

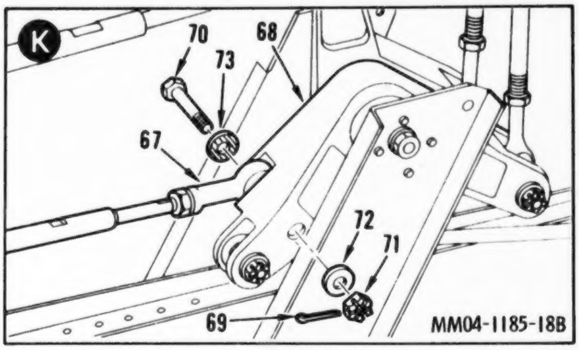
4-8-10. NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE REMOVAL (cont) 4-8-10

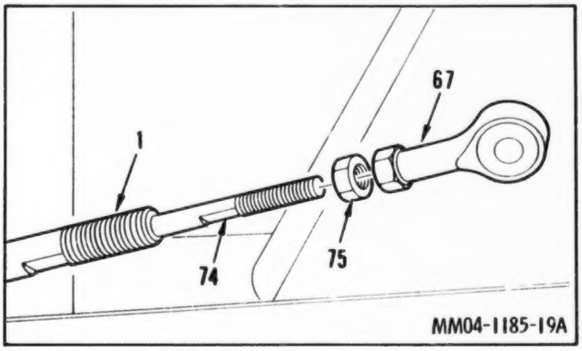
13. **Disconnect rod end (67) from bellcrank (68).**
    - a. Remove cotter pin (69).
    - b. Hold bolt (70).
    - c. Remove nut (71) and washer (72).
    - d. Remove bolt (70) and washer (73) from bellcrank (68).

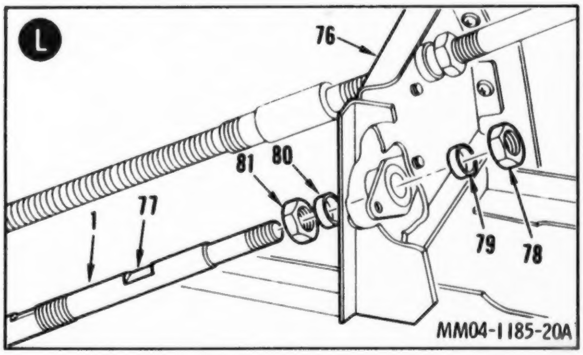
14. **Remove rod end (67) from center cable (1).**
    - a. Hold cable (1) at wrench flats (74).
    - b. Loosen nut (75).
    - c. Remove rod end (67) and nut (75) from cable (1).

15. **Remove center cable (1) from bracket (76).**
    - a. Hold cable (1) at wrench flats (77).
    - b. Remove nut (78) and spacer (79) from cable (1).
    - c. Pull cable (1) aft until free of bracket (76).
    - d. Remove spacer (80) and nut (81).

16. **Remove center cable (1) from helicopter through transmission deck.**







B. **CLEANING**

Clean rod end, cable support, and support bracket (para 1-5-36).

C. **INSPECTION**

1. **Check rod end for thread damage and bearing surface scars.** None allowed.
2. **Check cable support and support bracket for cracks.**
3. **Check rod end, cable support and support bracket for corrosion** (para 1-5-38).

END OF TASK

4-8-11. NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE INSTALLATION 4-8-11

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 3/8 Drive	5120-00-288-8865
Wrench, Torque, 1/4 Drive	5120-00-117-4832
Rigging Kit, Control Systems	1730-01-181-9270
Scale, Dial Indicating	6670-00-240-5821
Crowfoot Attachment 7/8, 3/8 Drive	5180-00-181-6765

Materials/Parts:

Cotter Pin

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

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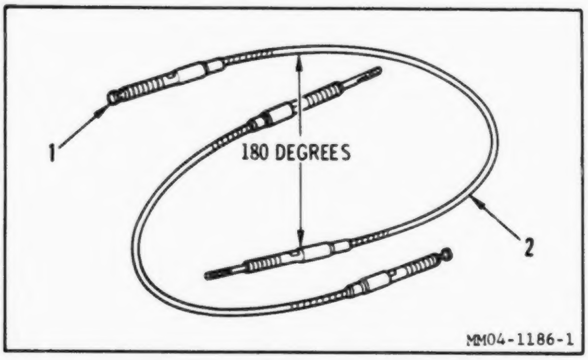
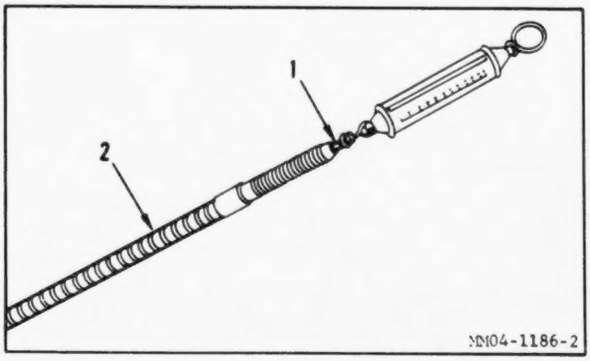
1. **Check center cable ribbon (1) for movement.** Do not install cable if ribbon (1) moves during check.
   a. Bend cable (2) **180 DEGREES** in one direction. Ribbon (1) should not move.
   b. Bend cable (2) **180 DEGREES** in opposite direction. Ribbon (1) should not move.



2. **Check center cable ribbon (1) friction load.** If friction load exceeds **1-1/2 POUNDS**, do not install cable (2).
   a. Place cable (2) on flat work surface.
   b. Make sure cable (2) is straight and not twisted.
   c. Attach dial-indicating scale to end of cable ribbon (1) and check load. If friction load exceeds **1-1/2 POUNDS**, do not install cable (2).



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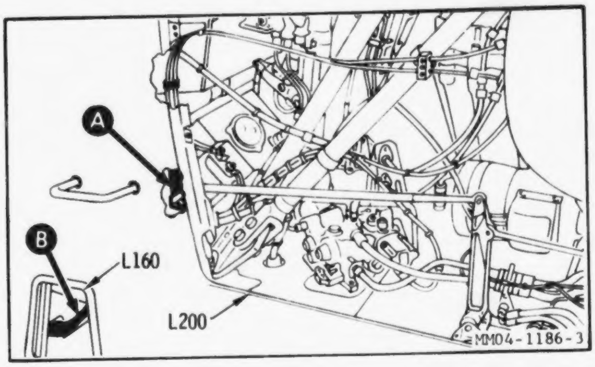
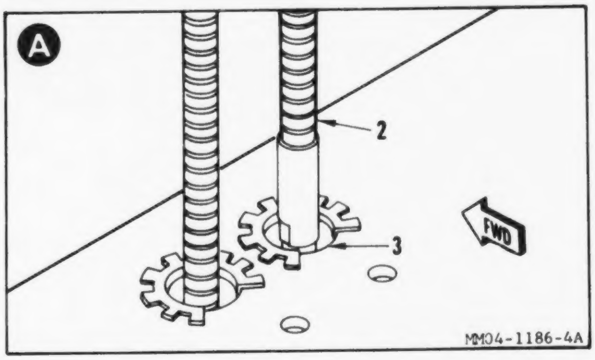
4-8-11. NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE INSTALLATION (cont) 4-8-11

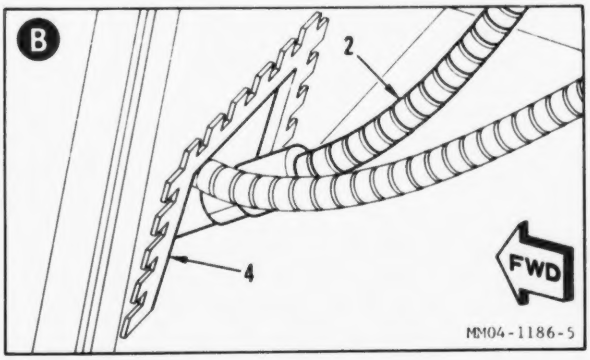

A
B
L160
L200
MM04-1186-3

2. Route center cable (2) from transmission deck to pilot station.

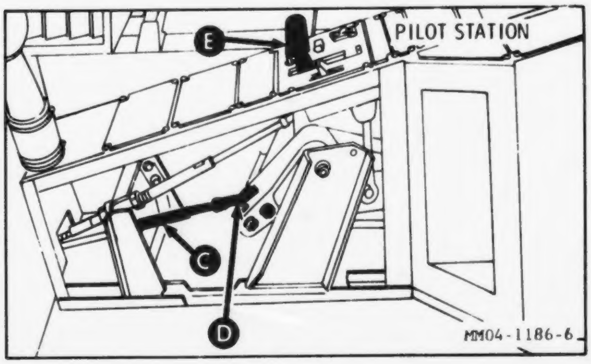
3. Guide threaded end of cable (2) through hole (3) in forward left transmission deck.


A
2
3
FWD
MM04-1186-4A

4. Guide cable (2) through hole (4) in pilot station bulkhead.


B
2
4
FWD
MM04-1186-5

5. Enter pilot station (para 1-7-1). Observe all safety precautions.


PILOT STATION
E
C
D
MM04-1186-6

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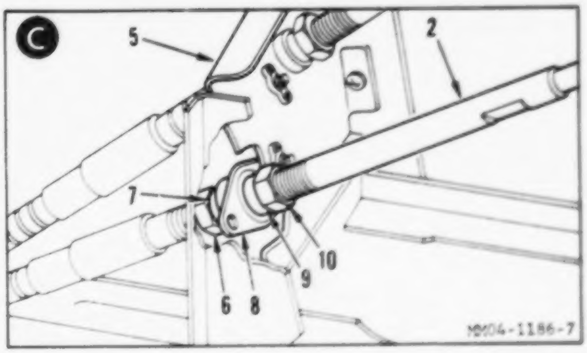
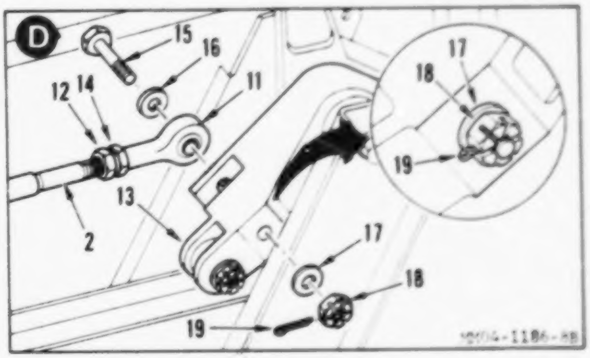
4-8-11. NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE INSTALLATION (cont) 4-8-11



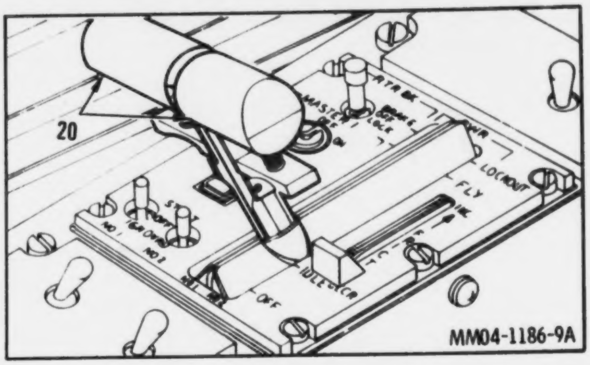


6. **Install center cable (2) on bracket (5).**
   a. Center nut (6) on threaded area of cable (2).
   b. Install spacer (7) on cable (2).
   c. Slide cable (2) through bearing (8) on bracket (5).
   d. Install spacer (9) on cable (2).
   e. Install nut (10) on cable (2) and tighten until spacer (9) contacts bearing (8).
7. **Install rod end (11) on cable (2).**
   a. Install nut (12) on cable (2) so **1/2-INCH** of cable end is exposed.
   b. Install rod end (11) **1/2-INCH** on cable (2) and aline with bellcrank (13).
8. **Torque nut (12) to 20 INCH-POUNDS.**
   a. Hold rod end (11) at wrench flats (14).
   b. Torque nut (12) to **20 INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 inch-pounds).
9. **Connect rod end (11) to bellcrank (13).**
   a. Insert bolt (15) with washer (16) through bellcrank (13) and rod end (11).
   b. Install washer (17) and nut (18) on bolt (15).
10. **Torque nut (18) 14 to 18 INCH-POUNDS and install cotter pin (19).**
    a. Hold bolt (15). Install nut (18).
    b. Torque nut (18) to **14 INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 inch-pounds).
    c. Increase torque to aline cotter pin holes, but do not exceed **18 INCH-POUNDS.**
    d. Install new cotter pin (19).

GO TO NEXT PAGE

4-8-11. NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE INSTALLATION (cont)

11. **Position pilot power levers (20) in IDLE position.**


20
MASTER
LOCKOUT
FLY
IDLE
OFF
MM04-1186-9A

12. **Adjust center cable (2) travel from 4.25 to 4.75 INCHES.**

    a. Insert rig pin through bracket (21) and bellcranks (13) and (22).

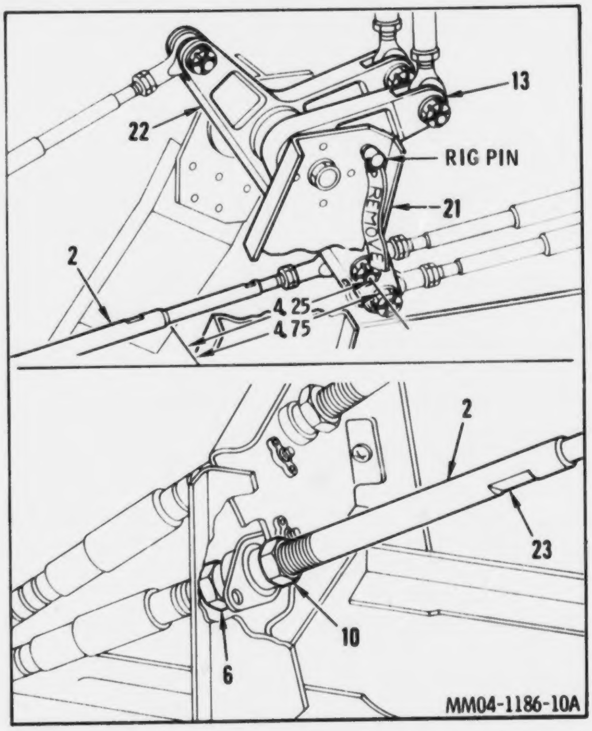
    b. Adjust nuts (6) and (10) to get correct travel.

    c. Tighten nuts (6) and (10).

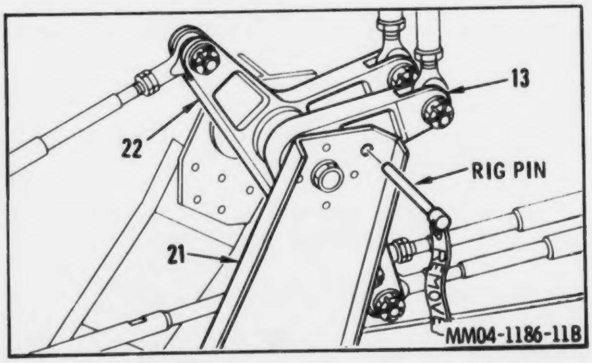
13. **Torque nuts (6) and (10) to 90 INCH-POUNDS.**

    a. Hold cable (2) at wrench flats (23).

    b. Torque nuts (6) and (10) to **90 INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 inch-pounds).


13
22
RIG PIN
REMOVE
21
2
4.25
4.75
2
23
10
6
MM04-1186-10A

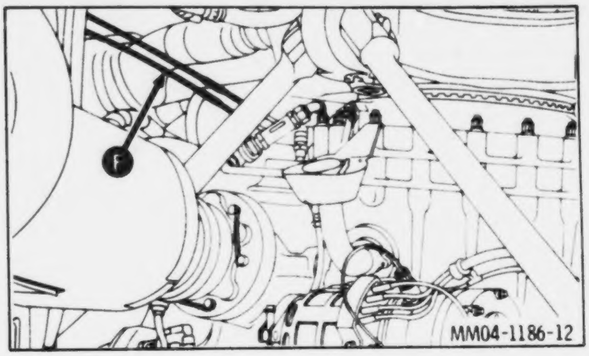
14. **Remove rig pin from bracket (21) and bellcranks (13) and (22).**


13
22
RIG PIN
21
REMOVE
MM04-1186-11B

GO TO NEXT PAGE

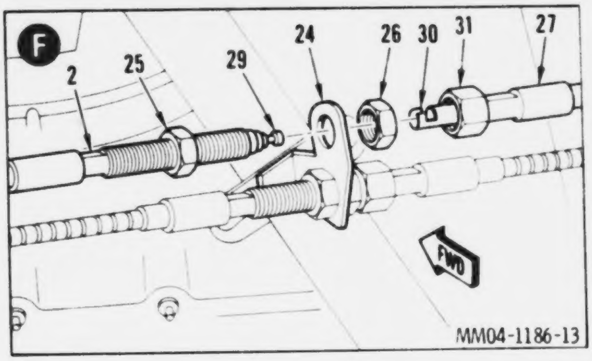
4-8-11. NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE INSTALLATION (cont) 4-8-11

15. **Connect center cable (2) on bracket (24).**
    a. Install nut (25) in center of threaded area of cable (2).
    b. Insert cable (2) through bracket (24).
    c. Screw nut (26) three turns on cable (2).



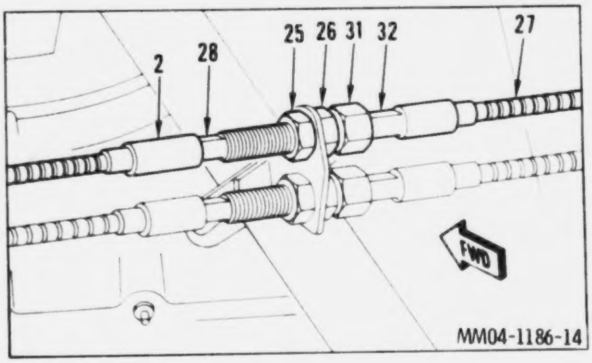
MM04-1186-12

16. **Connect center cable (2) to aft cable (27).**
    a. Adjust nuts (25) and (26) as needed to aline center cable (2) with aft cable (27).
    b. Connect cable (2) male connector (29) to cable (27) female connector (30).
    c. Install coupling nut (31) on cable (2).



MM04-1186-13

17. **Torque nuts (25) and (26) to 90 INCH-POUNDS.**
    a. Hold center cable (2) at wrench flats (28).
    b. Torque nuts (25) and (26) to **25 INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 inch-pounds).



MM04-1186-14

18. **Torque coupling nut (31) to 70 INCH-POUNDS.**
    a. Hold aft cable (27) at wrench flats (32).
    b. Torque nut (31) to **70 INCH-POUNDS.** Use 1/4 drive torque wrench (30-150 inch-pounds).

19. **Inspect (TI).**

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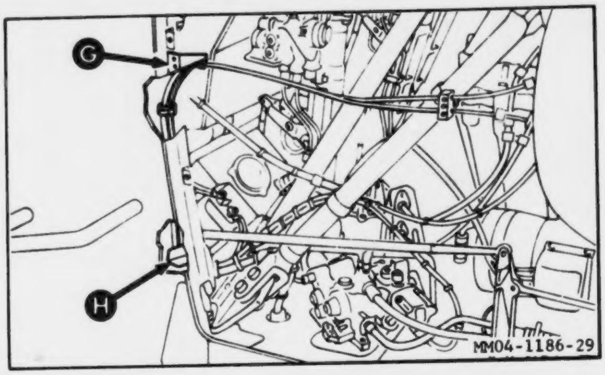
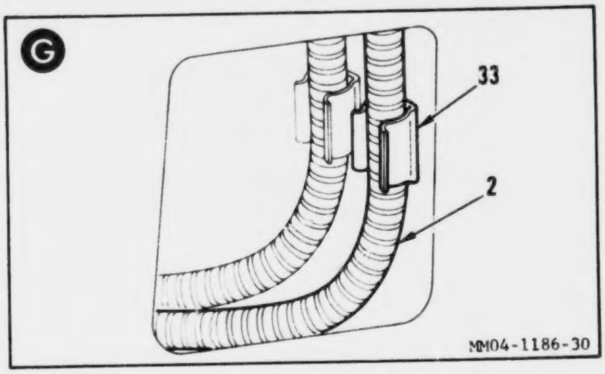
4-8-11. NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE INSTALLATION (cont)


G
H
MM04-1186-29

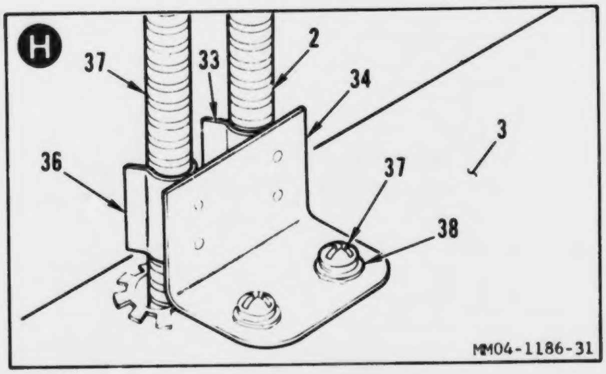
23. Insert center cable (2) into clip (33).


G
33
2
MM04-1186-30

24. Install bracket (34) on transmission deck (3).

    a. Insert center cable (2) and cable (35) in clip (36).

    b. Install two washers (38) and two screws (37).


H
37
33
2
34
3
36
37
38
MM04-1186-31

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4-8-11. NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE INSTALLATION (cont)

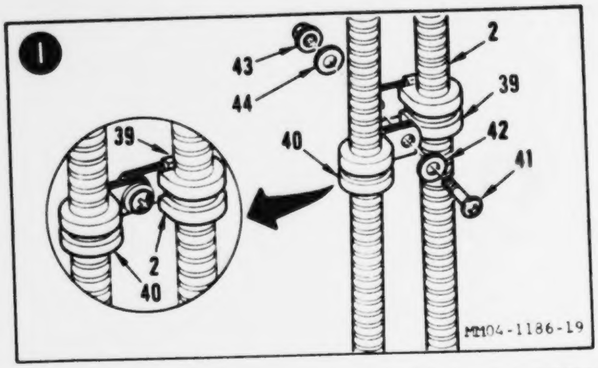
25. Connect clamp (39) to clamp (40).

a. Position clamp (39) on center cable (2).

b. Insert screw (41) through washer (42) into clamps (39) and (40).

c. Hold screw (41).

d. Install nut (43) with washer (44).


I
43
44
2
39
42
41
40
39
2
40
MM04-1186-19

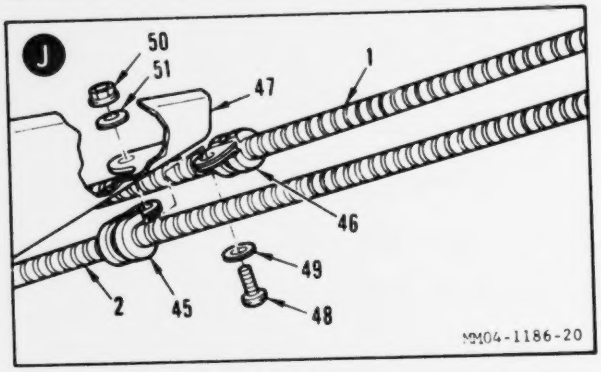
26. Install clamps (45) and (46) on bracket (47).

a. Position clamp (45) on center cable (2).

b. Insert screw (48) through washer (49) into clamps (45) and (46) and bracket (47).

c. Hold screw (48).

d. Install nut (50) and washer (51).

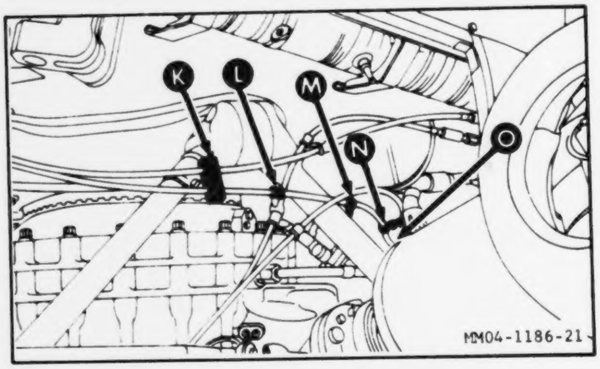

J
50
51
47
1
46
49
48
2
45
MM04-1186-20

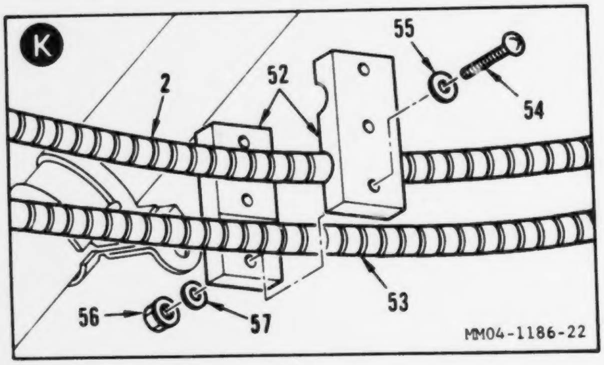
27. Install clamp (52) on center cable (2) and cable (53).

a. Position clamp (52) on cables (2) and (53).

b. Insert two screws (54) through washers (55) in clamp (52).

c. Hold screws (54), install two washers (57) and nuts (56).


K
L
M
N
O
MM04-1186-21


K
55
52
2
54
53
56
57
MM04-1186-22

GO TO NEXT PAGE

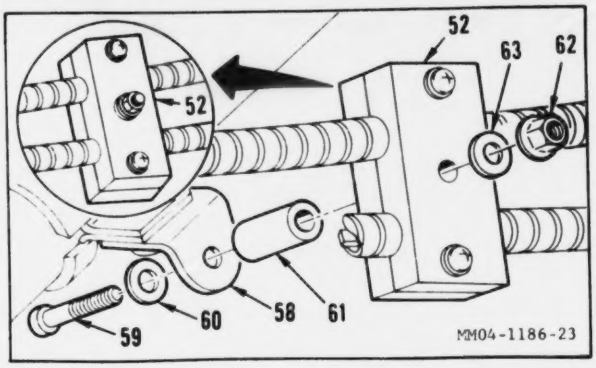
4-8-11. NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE INSTALLATION (cont) 4-8-11

28. **Install clamp (52) on bracket (58).**

    a. Insert screw (59) through washer (60), bracket (58), spacer (61), and clamp (52).

    b. Hold screw (59).

    c. Install washer (63) and nut (62).



MM04-1186-23

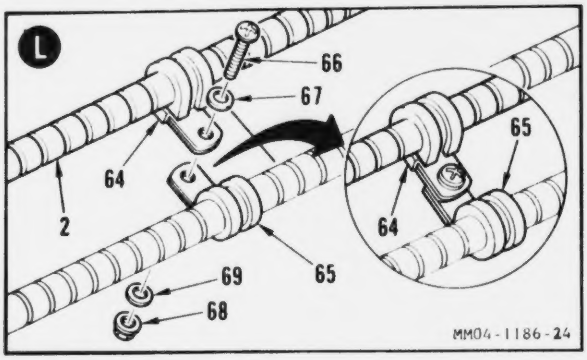
29. **Connect clamp (64) to clamp (65).**

    a. Position clamp (64) on center cable (2).

    b. Insert screw (66) through washer (67) into clamps (65) and (64).

    c. Hold screw (66).

    d. Install washer (69) and nut (68).



MM04-1186-24

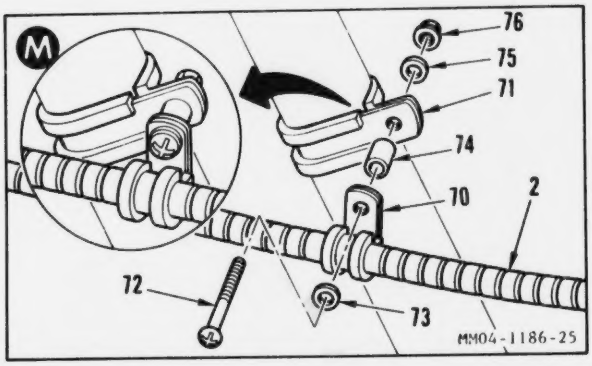
30. **Connect clamp (70) to clamp (71).**

    a. Position clamp (70) on center cable (2).

    b. Insert screw (72) through washer (73), clamp (70), spacer (74), and clamp (71).

    c. Hold screw (72).

    d. Install washer (75) and nut (76).



MM04-1186-25

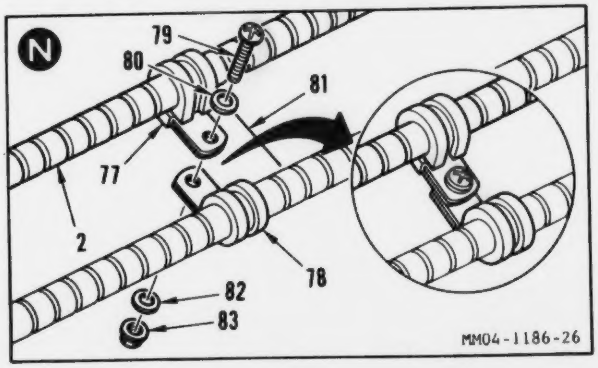
31. **Connect clamp (77) to clamp (78).**

    a. Position clamp (77) on center cable (2).

    b. Insert screw (79) through washer (80), bracket (81) and clamps (77) and (78).

    c. Hold screw (79).

    d. Install washer (82) and nut (83).



MM04-1186-26

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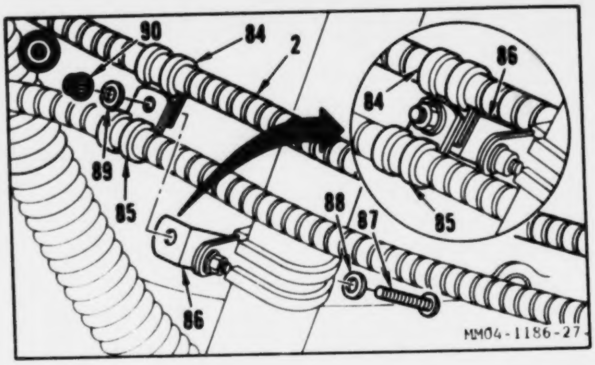
4-8-11. NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE INSTALLATION (cont) 4-8-11



32. **Install clamps (84) and (85) on bracket (86).**
    a. Position clamp (84) on center cable (2).
    b. Insert screw (87) through washer (88), bracket (86) and clamps (84) and (85).
    c. Hold screw (87).
    d. Install washer (89) and nut (90).
33. **Perform rigging check** (para 4-8-36). **Observe all safety precautions.**
34. **Install transformer-rectifier No. 2** (para 9-5-6).
35. **Secure access panels L20, R20 and L160** (para 2-2-2).
36. **Install pilot left console panels** PL1 and PL3 (para 2-2-8).
37. **Inspect (TI).**
38. **Perform power plant operational check (engine 2)** (TM 55-1520-238-T).

END OF TASK

4-8-12. NO. 1 OR NO. 2 ENGINE LOAD DEMAND SPINDLE FORWARD CABLE REMOVAL 4-8-12

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

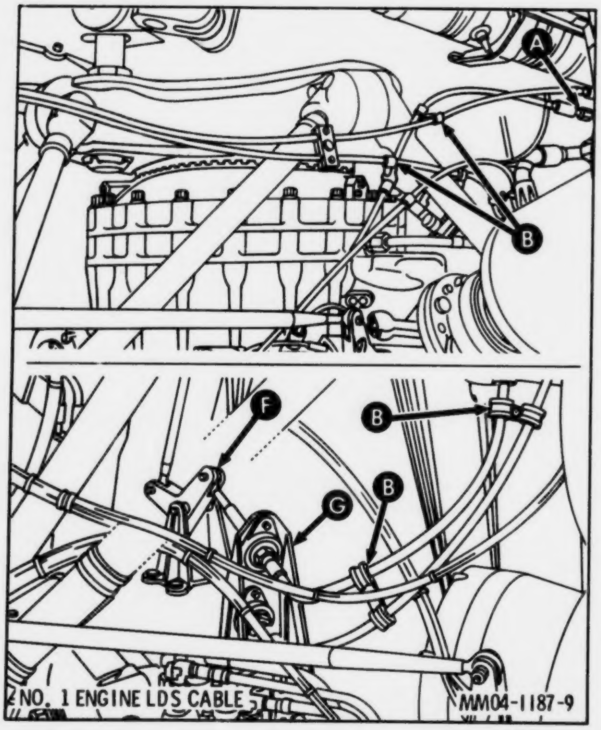
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Scale, Dial Indicating	6770-00-240-5821

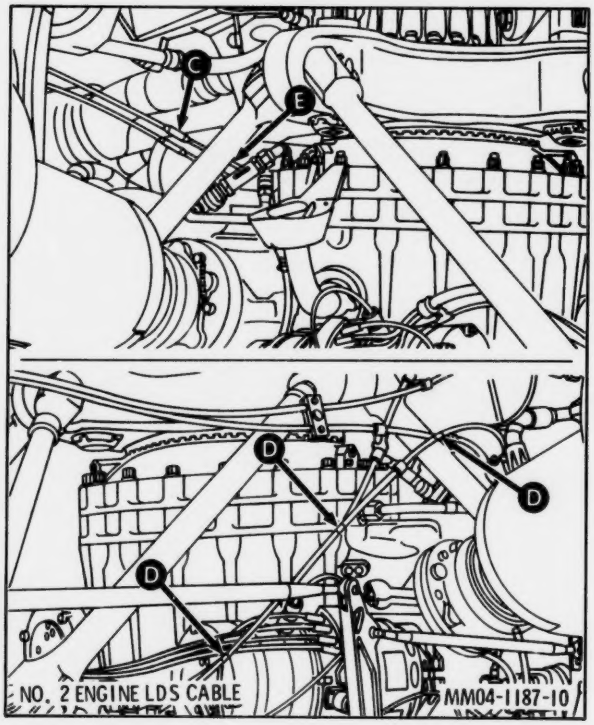
Personnel Required:

67R10 Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access panel L200 removed, engine platform door LN1 opened for No. 1 engine or L200 and R200 removed and engine platform door RN1 opened for No. 2 engine


A
B
F
B
G
B
NO. 1 ENGINE LDS CABLE
MM04-1187-9


C
E
D
D
D
NO. 2 ENGINE LDS CABLE
MM04-1187-10

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4-8-12. NO. 1 OR NO. 2 ENGINE LOAD DEMAND SPINDLE FORWARD CABLE REMOVAL (cont) 4-8-12

NOTE

This task is typical for No. 1 or No. 2 engine load demand spindle forward cable. Except as noted.

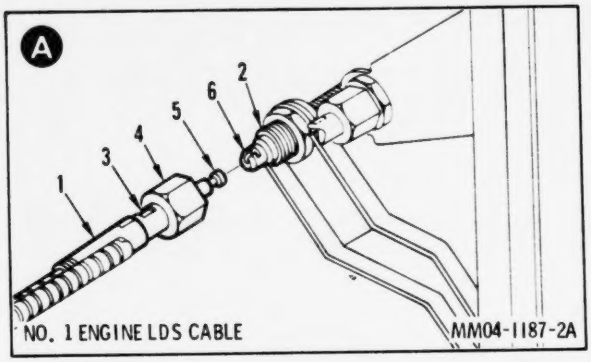
A. REMOVAL

1. On No. 1 engine, disconnect engine load demand spindle forward cable (1) from aft cable (2).

a. Hold cable (1) at flats (3).

b. Remove coupling nut (4).

c. Detach male connector (5) from female connector (6).


A
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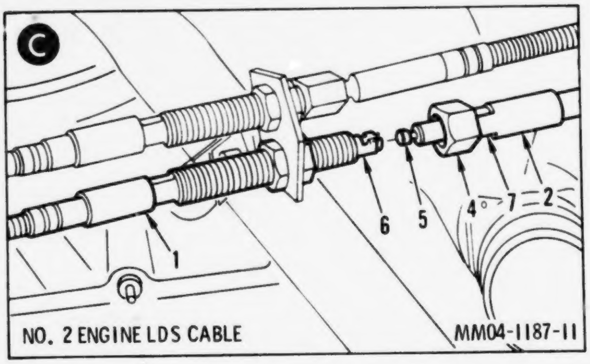
1
NO. 1 ENGINE LDS CABLE
MM04-1187-2A

2. On No. 2 engine, disconnect aft cable (2) from forward cable (1).

a. Hold aft cable (2) at flats (7).

b. Remove coupling nut (4).

c. Detach female connector (6) from male connector (5).


C
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1
NO. 2 ENGINE LDS CABLE
MM04-1187-11

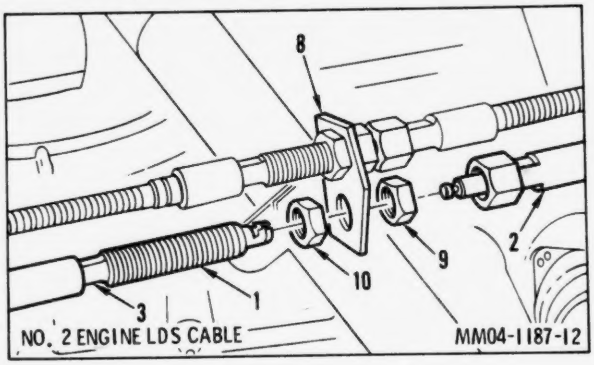
3. On No. 2 engine remove forward cable (1) from support bracket (8).

a. Hold cable (1) at flats (3).

b. Remove jam nut (9) from cable (1).

c. Remove cable (1) from bracket (8).

d. Remove jam nut (10) from cable (1).


8
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NO. 2 ENGINE LDS CABLE
MM04-1187-12

GO TO NEXT PAGE

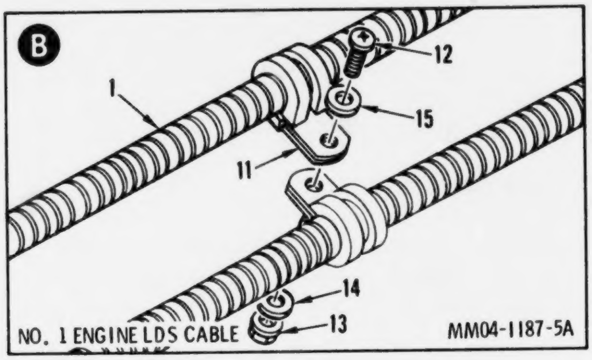
4-8-12. NO. 1 OR NO. 2 ENGINE LOAD DEMAND SPINDLE FORWARD CABLE REMOVAL (cont) 4-8-12

4. **On No. 1 engine, remove four clamps (11) from forward cable (1).**

   a. Hold screw (12). Remove nut (13) and washer (14).

   b. Remove screw (12) and washer (15).

   c. Remove clamp (11) from cable (1).


B
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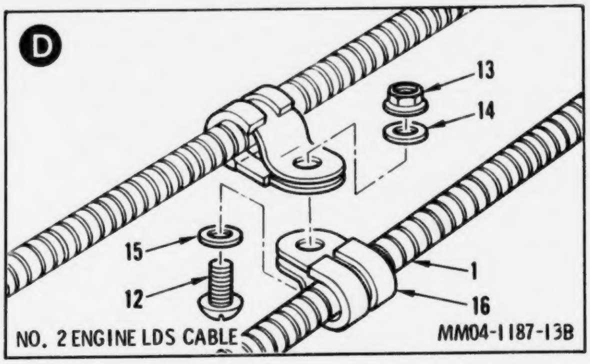
NO. 1 ENGINE LDS CABLE
MM04-1187-5A

5. **On No. 2 engine, remove three clamps (16) from forward cable (1).**

   a. Hold screw (12). Remove nut (13) and washer (14).

   b. Remove screw (12) and washer (15).

   c. Remove clamp (16) from cable (1).


D
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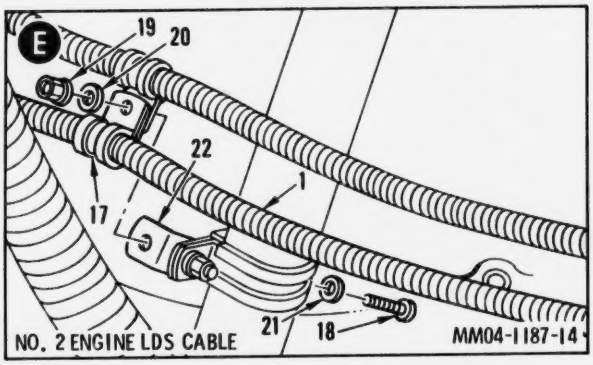
16
NO. 2 ENGINE LDS CABLE
MM04-1187-13B

6. **On No. 2 engine, remove clamp (17) from forward cable (1).**

   a. Hold screw (18). Remove nut (19) and washer (20).

   b. Remove screw (18) and washer (21) from clamp (17) and bracket (22).

   c. Remove clamp (17) from cable (1).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NO. 2 ENGINE LDS CABLE
MM04-1187-14

GO TO NEXT PAGE

4-8-12. NO. 1 OR NO. 2 ENGINE LOAD DEMAND SPINDLE FORWARD CABLE REMOVAL (cont) 4-8-12

7. **Disconnect rod end (23) from bellcrank (24).**

   a. Remove and discard cotter pin (25).

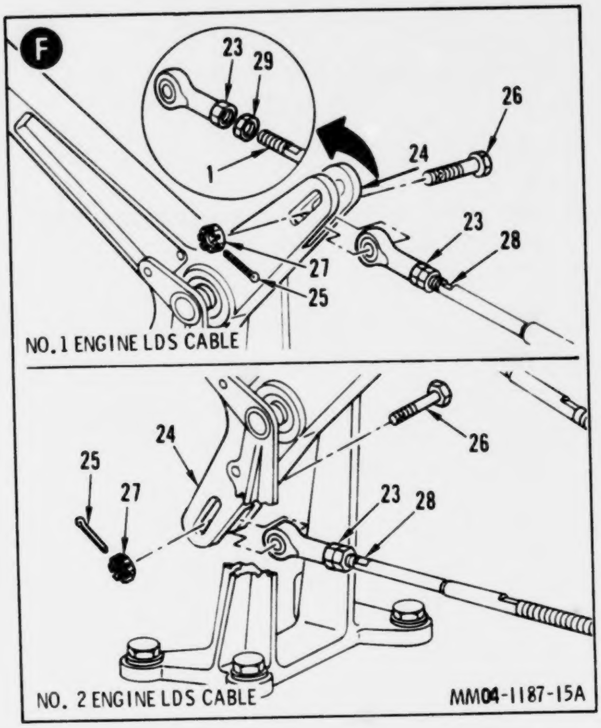
   b. Hold bolt (26). Remove nut (27).

   c. Remove bolt (26) from bellcrank (24) and rod end (23).

8. **Remove rod end (23) from forward cable (1).**

   a. Hold cable (1) at flats (28) and jam nut (29).

   b. Remove rod end (23) and jam nut (29) from cable (1).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NO. 1 ENGINE LDS CABLE
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NO. 2 ENGINE LDS CABLE
MM04-1187-15A

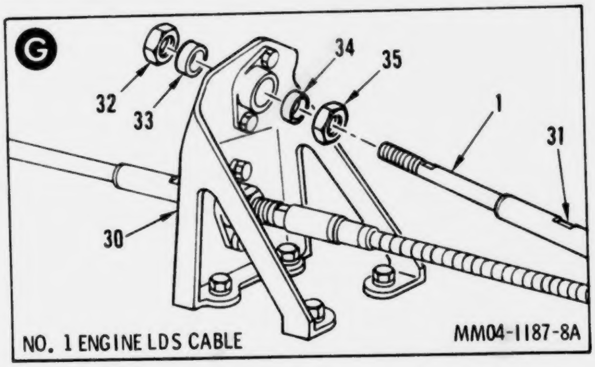
9. **Remove forward cable (1) from cable support (30).**

   a. Hold cable (1) at flats (31) and remove nut (32) and spacer (33).

   b. Pull cable (1) outboard until free of support (30).

   c. Remove spacer (34) and nut (35).

   d. Remove cable (1) from helicopter.


G
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NO. 1 ENGINE LDS CABLE
MM04-1187-8A

GO TO NEXT PAGE

4-8-12. NO. 1 OR NO. 2 ENGINE LOAD DEMAND SPINDLE FORWARD CABLE REMOVAL (cont) 4-8-12

B. CLEANING

Clean rod end, cable support, and support bracket (para 1-5-36).

C. INSPECTION

1. **Check rod end for thread damage and bearing surface scars.** None allowed.

2. **Check cable support and support bracket for cracks.**

3. **Check rod end, cable support, and support bracket for corrosion** (para 1-5-38).

4. **Check cable ribbon for friction.** If friction load exceeds **1.5 POUNDS** in either direction, install new cable .

   a. Lay cable on flat surface.

   b. Make sure cable is not twisted.

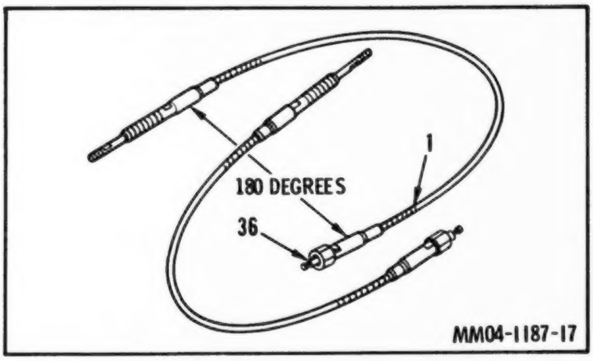
   c. Stroking ribbon **2.5 INCHES** in both directions, measure pull. Use dial indicating scale. If friction load exceeds **1.5 POUNDS** in either direction, install new cable .

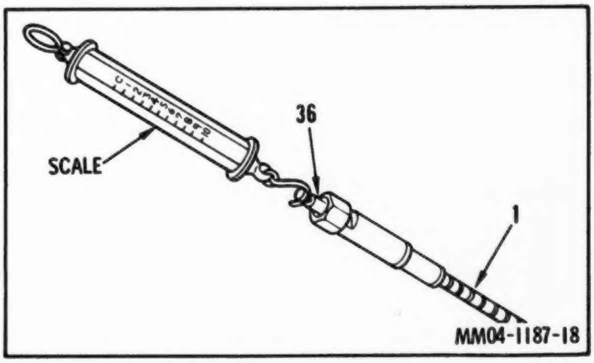
5. **Check cable ribbon (36) for movement.**

   a. Lay forward cable (1) on flat surface.

   b. Bend cable (1) **180 DEGREES** with ends parallel. No movement of ribbon (36) allowed.

   c. Bend cable (1) **180 DEGREES** in opposite direction with ends parallel. No movement of ribbon (36) allowed.





END OF TASK

4-8-13 NO. 1 OR NO. 2 ENGINE LOAD DEMAND SPINDLE FORWARD CABLE INSTALLATION

This task covers: A. INSTALLATION B. ADJUSTMENT

Tools:

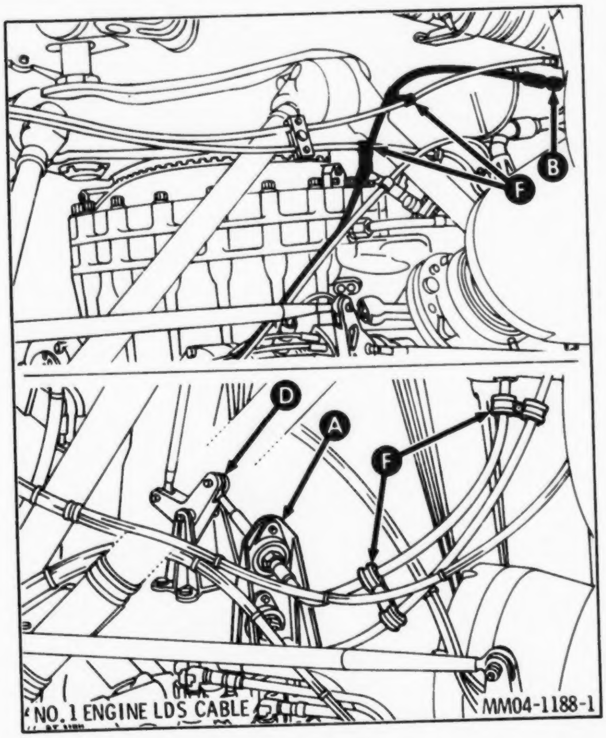
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Wrench, Torque, 1/4 Drive	5120-00-117-4832
Kit, Rigging Pin	1730-01-165-0957

Materials/Parts:

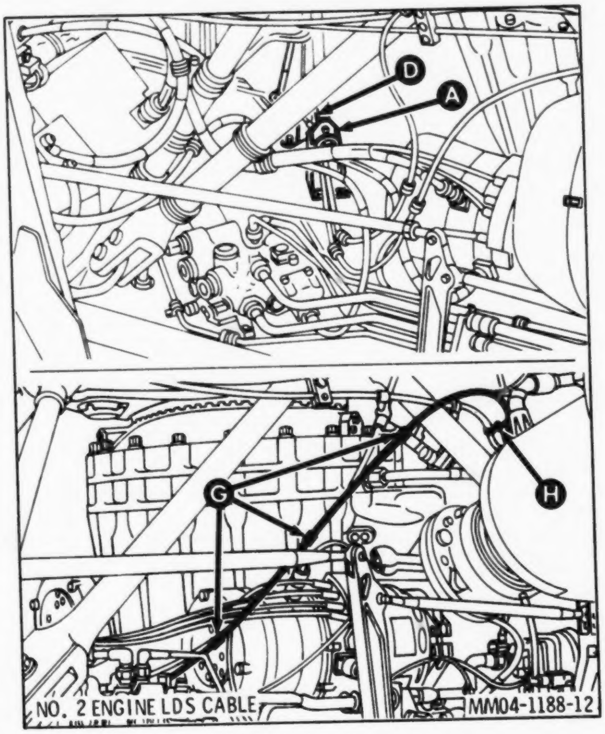
Cotter Pin (2)

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor



NO.1 ENGINE LDS CABLE



NO. 2 ENGINE LDS CABLE

NOTE

This task is typical for No. 1 or No. 2 engine load demand spindle forward cable. Except as noted.

GO TO NEXT PAGE

4-8-13. NO. 1 OR NO. 2 ENGINE LOAD DEMAND SPINDLE FORWARD CABLE INSTALLATION (cont) 4-8-13

A. **INSTALLATION**

1. **Install engine load demand spindle forward cable (1) on support (2).**

   a. Position jam nut (3) and spacer (4) on cable (1).

   b. Slide cable (1) through support bearing (5).

   c. Install spacer (6) and jam nut (7) on cable (1).

   d. Finger tighten nut (7) until spacer (6) just contacts bearing (5).

2. **Install rod end (8) on forward cable (1).** Torque jam nut (9) to **20 INCH-POUNDS.**

   a. Install jam nut (9) on cable (1).

   b. Install rod end (8) **1/2 INCH** onto cable threads (10).

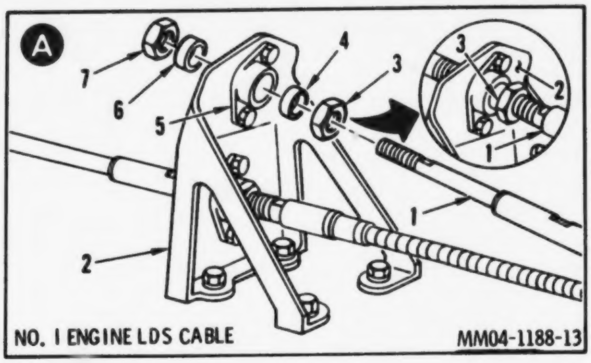
   c. Hold cable (1) at flats (11). Torque jam nut (9) to **20 INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 inch-pounds).

3. **On No. 1 engine, connect forward cable (1) to aft cable (12).** Torque coupling nut (13) to **60 INCH-POUNDS.**

   a. Attach male connector (14) to female connector (15).

   b. Install coupling nut (13).

   c. Hold cable (1) at flats (16) and torque nut (13) to **60 INCH-POUNDS.** Use 1/4 drive torque wrench (30-150 inch-pounds) and use crowfoot.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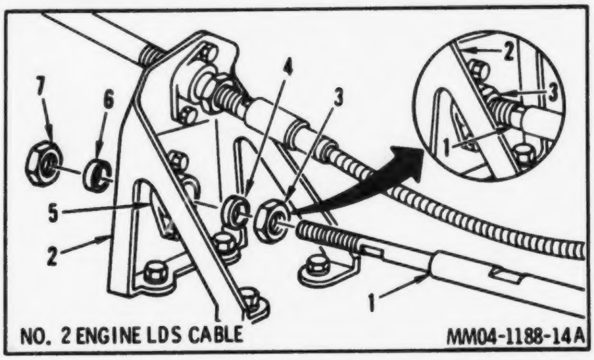
NO. I ENGINE LDS CABLE
MM04-1188-13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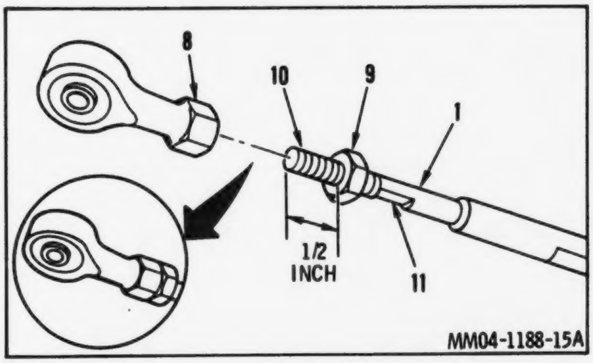
NO. 2 ENGINE LDS CABLE
MM04-1188-14A


8
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9
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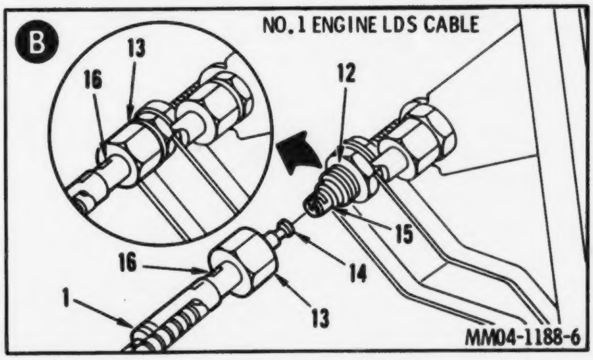
1/2
INCH
11
MM04-1188-15A


B
NO. 1 ENGINE LDS CABLE
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MM04-1188-6

GO TO NEXT PAGE

4-8-13. NO. 1 OR NO. 2 ENGINE LOAD DEMAND SPINDLE FORWARD CABLE INSTALLATION (cont)

4. **On engine No. 2, install forward cable (1) on support bracket (17).** Torque coupling nut (18) to **60 INCH-POUNDS** and jam nuts (19) and (20) to **20 INCH-POUNDS.**

   a. Position jam nut (19) on cable (1).

   b. Insert cable (1) through bracket (17). Thread jam nut (20) three turns onto cable (1).

   c. Adjust jam nuts (19) and (20) to aline female connector (14) with male connector (15) and attach.

   d. Install coupling nut (18).

   e. Hold aft cable (21) at flats (22). Torque coupling nut (18) to **60 INCH-POUNDS.** Use 1/4 drive crowfoot torque wrench (30-150 inch-pounds).

   f. Torque jam nuts (19) and (20) to **20 INCH-POUNDS.** Use 1/4 drive crowfoot torque wrench (0-30 inch-pounds).

5. **Inspect (TI).**

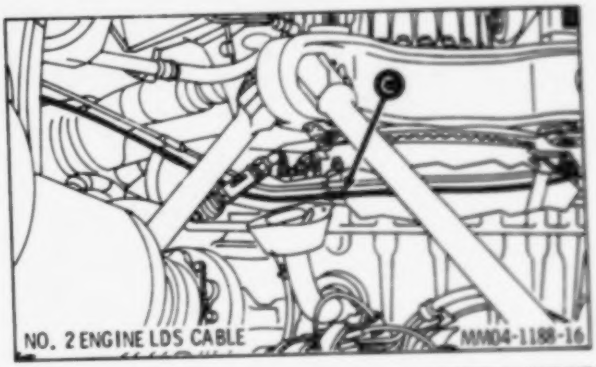
6. **Disconnect rod (23) from bellcrank (24).**

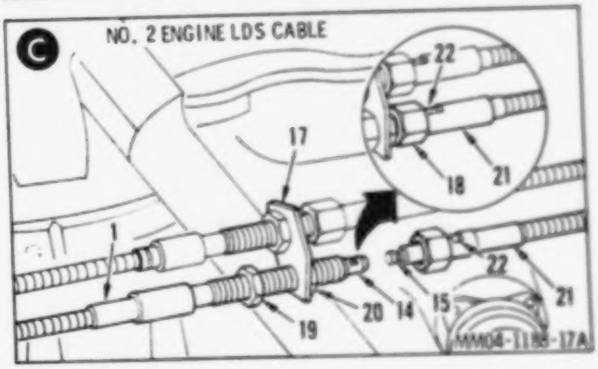
   a. Remove and discard cotter pin (25).

   b. Remove nut (26) from bolt (27).

   c. Remove bolt (27) from bellcrank (24) and rod end (28).

7. **Insert -5 rigging pin (29).** Aline lower hole in bellcrank (24) to lower hole in bracket (30).


C
NO. 2 ENGINE LDS CABLE
MM04-1188-16


C
NO. 2 ENGINE LDS CABLE
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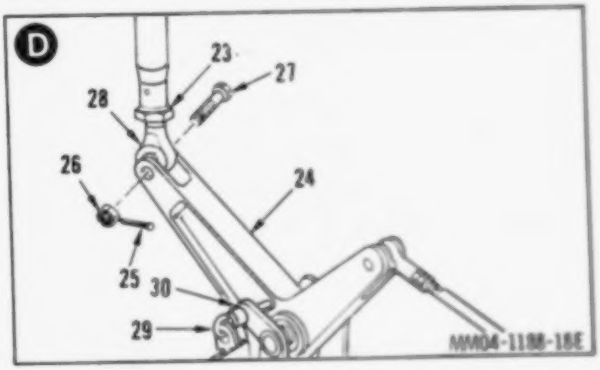
MM04-1188-17A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MM04-1188-18E

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4-8-13. NO. 1 OR NO. 2 ENGINE LOAD DEMAND SPINDLE FORWARD CABLE INSTALLATION (cont) 4-8-13

B. ADJUSTMENT

1. **On No. 1 engine, adjust engine load forward demand spindle cable (1) travel length.**

   a. Aline rod end (8) to bellcrank (24) and insert bolt (31).

   b. Obtain travel length of **2.39 INCHES** between center of bolt (31) and shoulder of cable (1), by adjusting jam nuts (3) and (7) at cable support (2).

   c. Remove bolt (31).

2. **On No. 2 engine, adjust forward cable (1) travel length.**

   a. Aline rod end (8) to bellcrank (24) and insert bolt (31).

   b. Obtain travel length of **4.23 INCHES** between center of bolt (31) and shoulder of cable (1), by adjusting jam nuts (3) and (7) at cable support (2).

   c. Remove bolt (31).

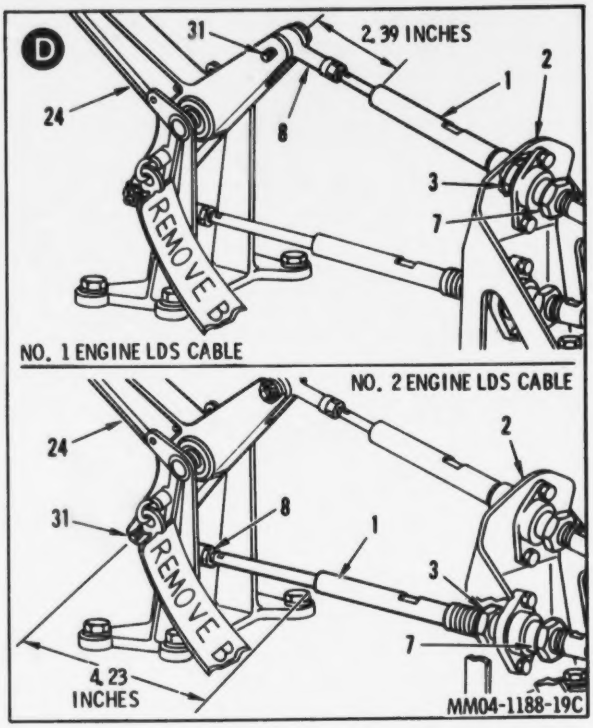
3. **Set load demand spindle gearbox (32) in ZERO DEGREE position and insert rigging pin (33).**

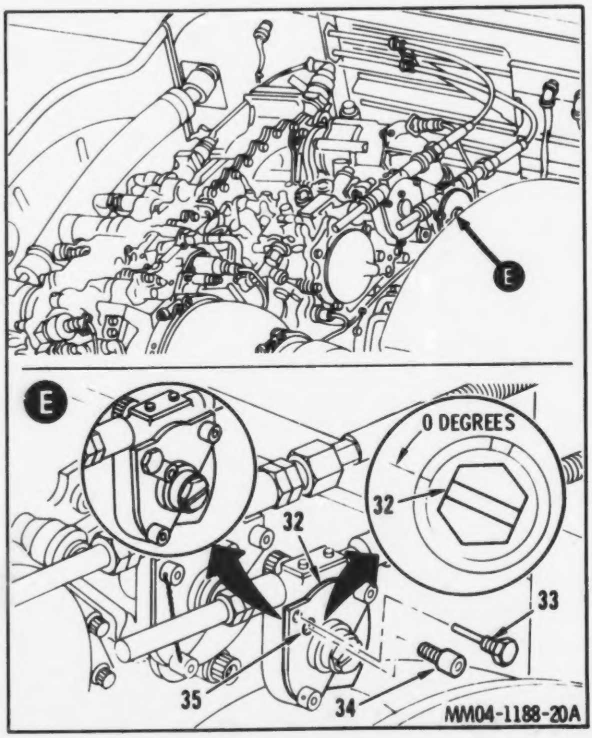
   a. Remove lockwire.

   b. Remove rigging pin (33) from stowage.

   c. Remove cap screw (34). Install in rigging pin stowage hole (35).

   d. Rotate gearbox (32) to **ZERO DEGREE** position. Insert rigging pin (33) in hole.


D
31
2.39 INCHES
2
1
24
8
3
7
REMOVE B
NO. 1 ENGINE LDS CABLE
NO. 2 ENGINE LDS CABLE
2
24
8
31
1
3
7
REMOVE B
4.23 INCHES
MM04-1188-19C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MM04-1188-20A

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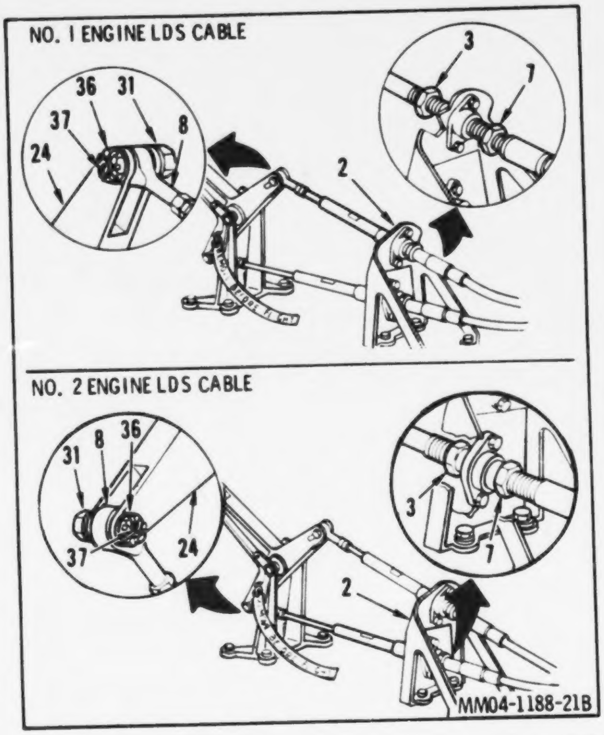
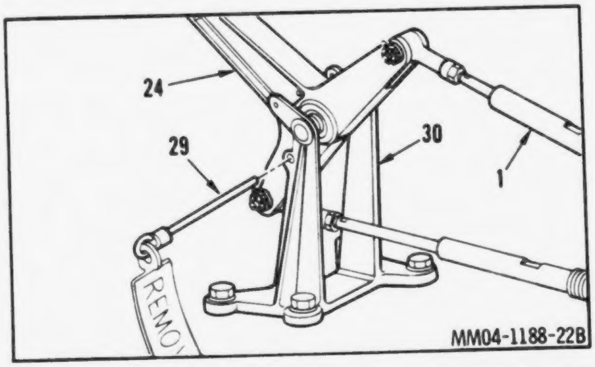
4-8-13. NO. 1 OR NO. 2 ENGINE LOAD DEMAND SPINDLE FORWARD CABLE INSTALLATION (cont) 4-8-13

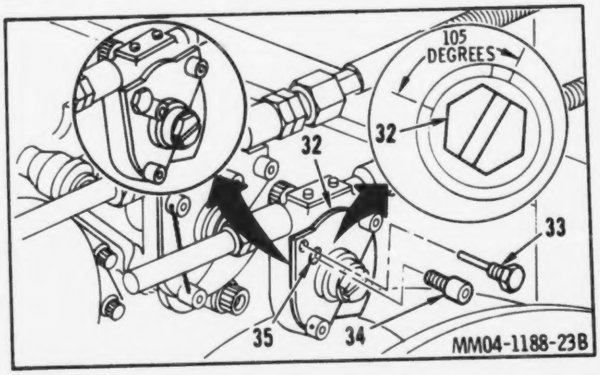
4. **Connect rod end (8) to bellcrank (24).** Torque nut (36) **14 to 18 INCH-POUNDS.**
    a. Aline rod end (8) to bellcrank (24) by adjusting jam nuts (3) and (7) at cable support (2).
    b. Install bolt (31).
    c. Hold bolt (31). Install nut (36).
    d. Torque nut (36) to **14 INCH-POUNDS** Use 1/4 drive torque wrench (0-30 inch-pounds).
    e. Increase torque to aline cotter pin holes but do not exceed **18 INCH-POUNDS.**
    f. Install new cotter pin (37).
5. **Torque jam nuts (3) and (7) to 90 INCH-POUNDS.** Use 1/4 drive torque wrench (30-150 inch-pounds).
6. **Check operation of forward cable (1).**
    a. Remove -5 rigging pin (29) from bellcrank (24) and bracket (30).
    b. Remove capscrew (34) from gearbox rigging pin stowage hole.
    c. Remove rigging pin (33) from gearbox (32) and stow.
    d. Install capscrew (34) into gearbox (32).
    e. Rotate bellcrank (24) several times through complete cycles to ensure smooth operation.
    f. When gearbox (32) is at **105-DEGREE** stop, rotate bellcrank (24) counterclockwise to verify HMU opens fully.



MM04-1188-21B



MM04-1188-22B



MM04-1188-23B

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4-8-13. NO. 1 OR NO. 2 ENGINE LOAD DEMAND SPINDLE FORWARD CABLE INSTALLATION (cont) 4-8-13

7. **Connect rod (23) to bellcrank (24).** Torque nut (26) **14 to 18 INCH-POUNDS.**

   a. Aline rod (23) to bellcrank (24).

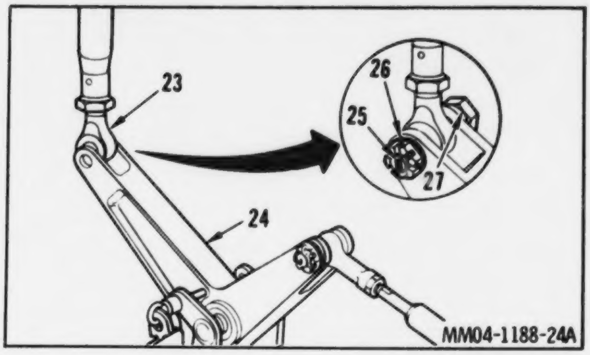
   b. Install bolt (27).

   c. Hold bolt (27). Install nut (26).

   d. Torque nut (26) to **14 INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 inch-pounds).

   e. Increase torque to aline cotter pin holes but do not exceed **18 INCH-POUNDS.**

   f. Install new cotter pin (25).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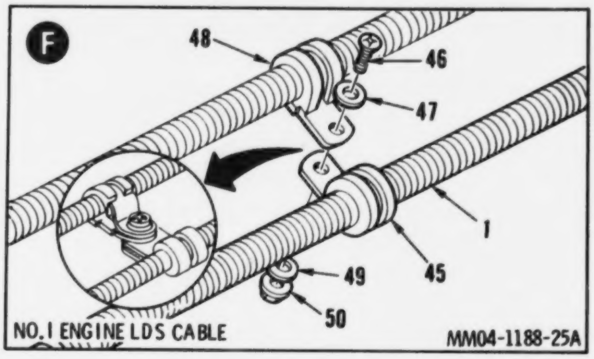
MM04-1188-24A

8. **On No. 1 engine, install four clamps (45) on forward cable (1).**

   a. Position clamp (45) on cable (1).

   b. Insert screw (46) through washer (47) and clamps (45) and (48).

   c. Hold screw (46). Install washer (49) and nut (50).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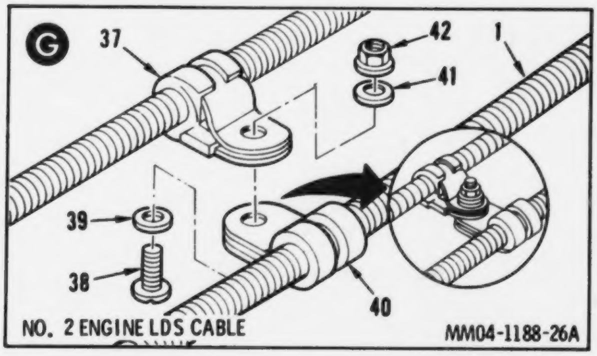
NO.1 ENGINE LDS CABLE
MM04-1188-25A

9. **On No. 2 engine, install three clamps (40) on cable (1).**

   a. Position clamp (40) on cable (1).

   b. Insert screw (38) through washer (39) and clamps (37) and (40).

   c. Hold screw (38). Install washer (41) and nut (42).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NO. 2 ENGINE LDS CABLE
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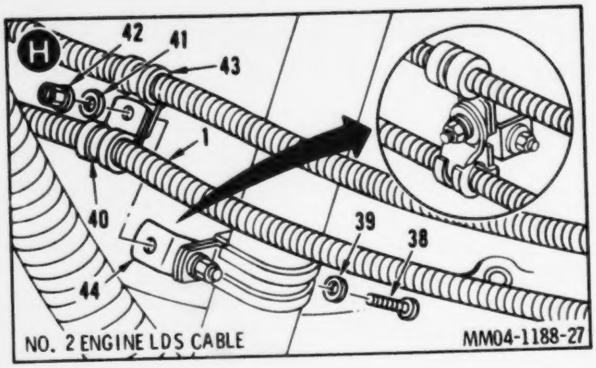
4-8-13. NO. 1 OR NO. 2 ENGINE LOAD DEMAND SPINDLE FORWARD CABLE INSTALLATION (cont)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NO. 2 ENGINE LDS CABLE
MM04-1188-27

10. **Install clamp (40) on forward cable (1).**
    a. Position clamp (40) on cable (1).
    b. Insert screw (38) through washer (39), clamps (40), and (43), and bracket (44).
    c. Hold screw (38). Install washer (41) and nut (42).
11. **Inspect (TI).**
12. **Perform load demand spindle rigging check** (para 4-8-33).
13. **Secure access panel L200 and door LN1 for No. 1 engine or access panel R200 and door RN1 for No. 2 engine.**

END OF TASK

4-8-14. ENGINE LOAD DEMAND SPINDLE CABLE SUPPORT REMOVAL 4-8-14

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

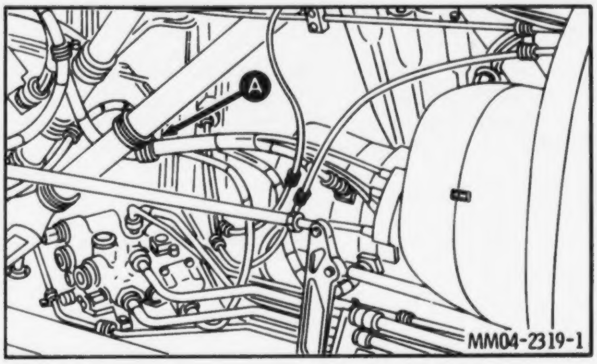
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

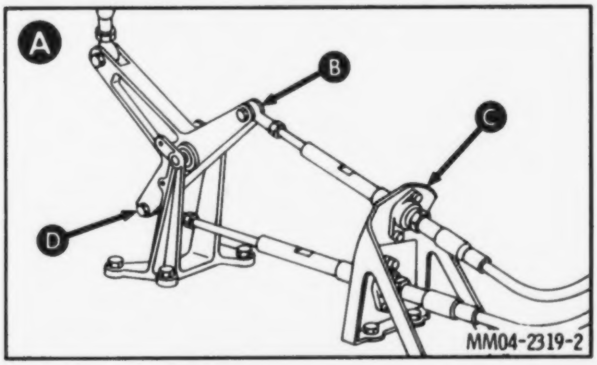
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access panel L200 removed

Personnel Required:

67R10 Attack Helicopter Repairer





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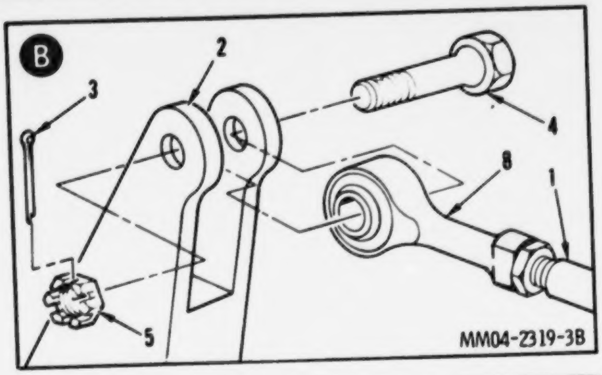
4-8-14. ENGINE LOAD DEMAND SPINDLE CABLE SUPPORT REMOVAL (cont)

A. REMOVAL

1. **Disconnect No. 1 engine load demand spindle (LDS) forward cable (1) from bellcrank (2).**
   - a. Remove and discard cotter pin (3).
   - b. Hold bolt (4).
   - c. Remove nut (5).
   - d. Remove bolt (4) from bellcrank (2) and rod end (8).
2. **Disconnect No. 2 engine LDS forward cable (9) from bellcrank (2).**
   - a. Remove and discard cotter pin (10).
   - b. Hold bolt (11).
   - c. Remove nut (12).
   - d. Remove bolt (11) from bellcrank (2) and rod end (15).
3. **Remove rod end (8) from cable (1).**
   - a. Hold cable flats (16).
   - b. Loosen nut (17).
   - c. Remove rod end (8) and nut (17) from cable (1).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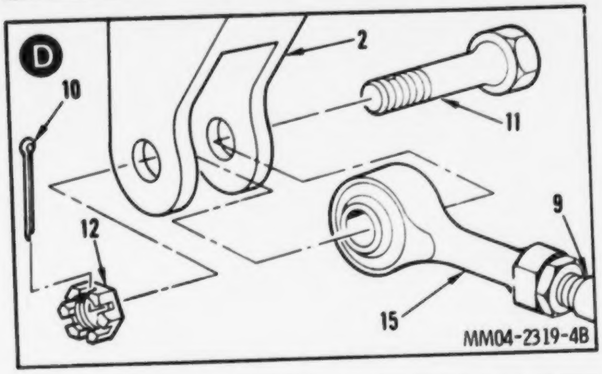
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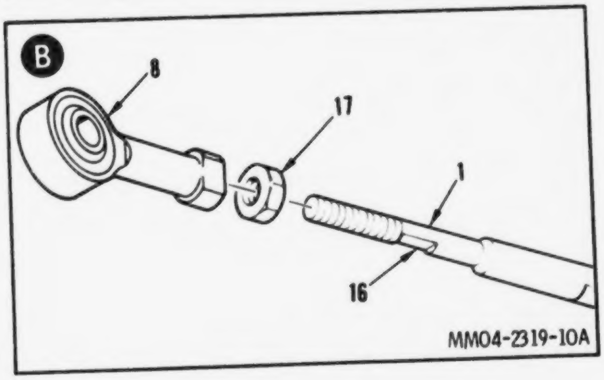
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MM04-2319-10A

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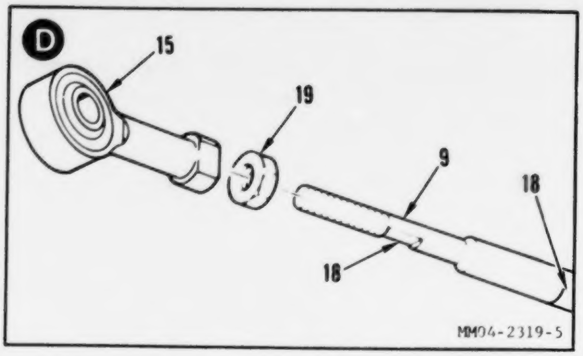
4-8-14. ENGINE LOAD DEMAND SPINDLE CABLE SUPPORT REMOVAL (cont) 4-8-14

4. **Remove rod end (15) from cable (9).**

   a. Hold cable flats (18).

   b. Loosen nut (19).

   c. Unscrew rod end (15) and nut (19) from cable (9).



MM04-2319-5

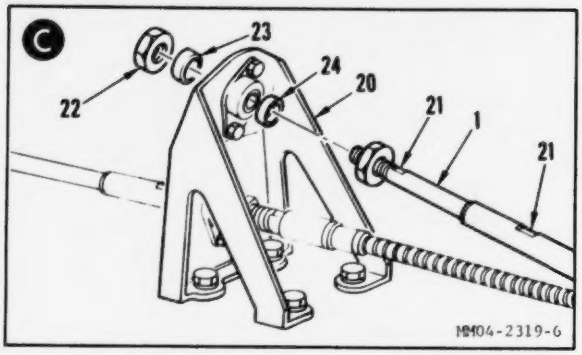
5. **Remove cable (1) from demand spindle cable load support (20).**

   a. Hold cable flats (21).

   b. Remove nut (22) and spacer (23) from cable (1).

   c. Pull cable (1) from support (20).

   d. Remove spacer (24).



MM04-2319-6

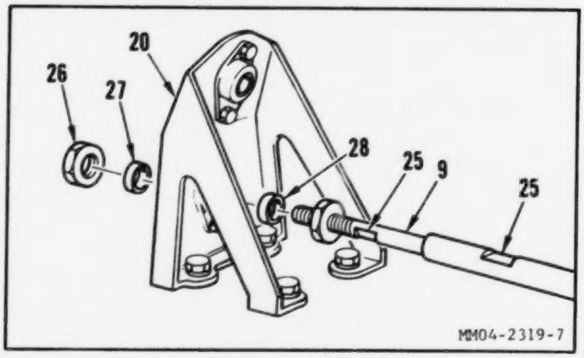
6. **Remove cable (9) from support (20).**

   a. Hold cable flats (25).

   b. Remove nut (26) and spacer (27) from cable (9).

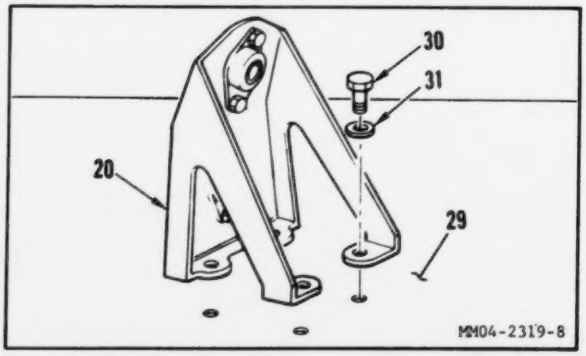
   c. Pull cable (9) from support (20).

   d. Remove spacer (28).



MM04-2319-7

7. **Remove support (20) from transmission deck (29).** Remove four bolts (30) and washers (31) from support (20) and deck (29).



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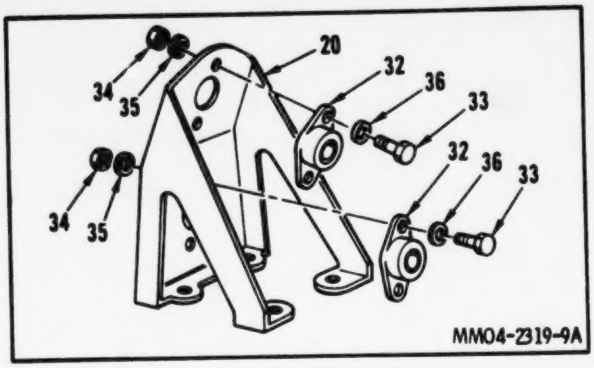
4-8-14. ENGINE LOAD DEMAND SPINDLE CABLE SUPPORT REMOVAL (cont) 4-8-14



8. **Remove two retainers (32) from support (20).**
   - a. Hold four bolts (33).
   - b. Remove four nuts (34) and washers (35).
   - c. Remove four bolts (33) and washers (36) from retainers (32) and support (20).

B. CLEANING

1. **Clean retainers and support mounting area on deck** (para 1-5-36).

C. INSPECTION

1. **Check retainers for rough bearing surfaces and cracks** (para 4-2-2).
2. **Check support mounting area on deck and support for cracks** (para 4-2-2).
3. **Check retainers and deck for corrosion** (para 1-5-38).

END OF TASK

4-8-15. ENGINE LOAD DEMAND SPINDLE CABLE SUPPORT INSTALLATION 4-8-15

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Wrench, Torque 1/4 Drive	5120-00-117-4832

Materials/Parts:

Cotter Pin (2)

Personnel Required:

67R10 Attack Helicopter Repairer
66R30 Inspector/Supervisor

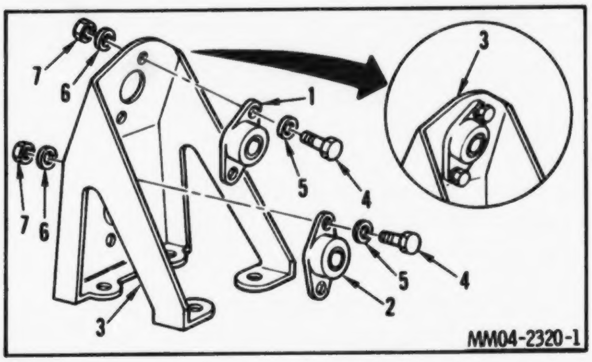
References:

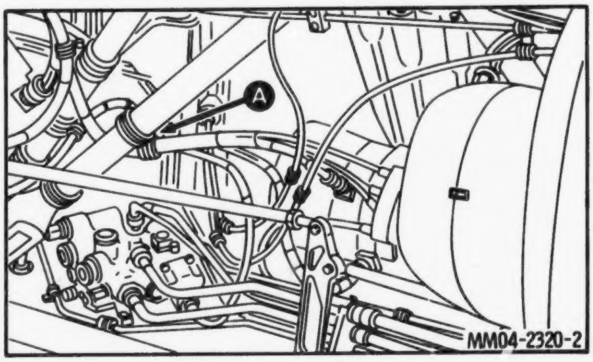
TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

1. **Install two retainers (1) and (2) on load demand spindle cable support (3).**
   a. Aline retainers (1) and (2) on aft face of support (3).
   b. Install with four washers (5) and bolts (4) through retainers (1) and (2) and support (3).
   c. Install four washers (6) and and nuts (7) on four bolts (4).





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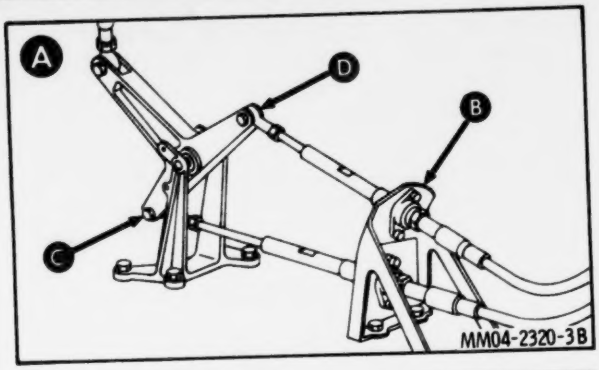
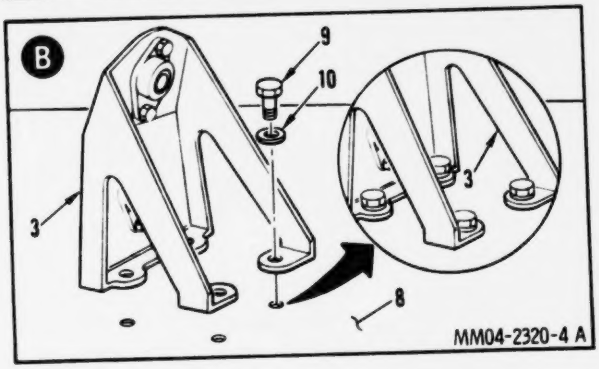




NOTE

Support legs must face aft.

2. **Install support (3) on transmission deck (8).**

   a. Aline support (3) on deck (8).

   b. Install four washers (10) with four bolts (9) through support (3), and deck (8).

3. **Install No. 2 engine load demand spindle (LDS) forward cable (11) in support (3).** Torque nuts (12) and (15) to **100 INCH-POUNDS.**

   a. Center nut (12) on threaded area on cable (11).

   b. Slide spacer (13) on cable (11).

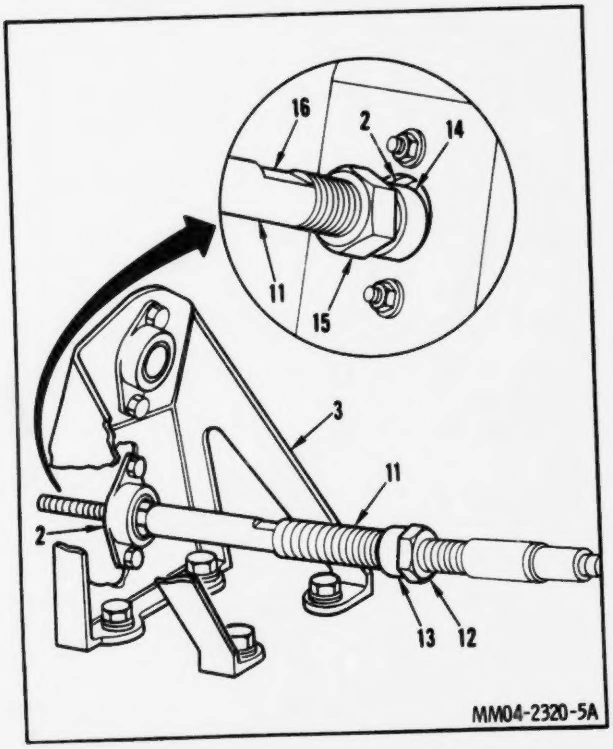
   c. Insert cable (11) through lower retainer (2).

   d. Slide spacer (14) on cable (11).

   e. Install nut (15) on cable (11). Turn nut (15) until spacer (14) contacts retainer (2).

   f. Hold cable flats (16).

   g. Torque nuts (12) and (15) to **100 INCH-POUNDS.**



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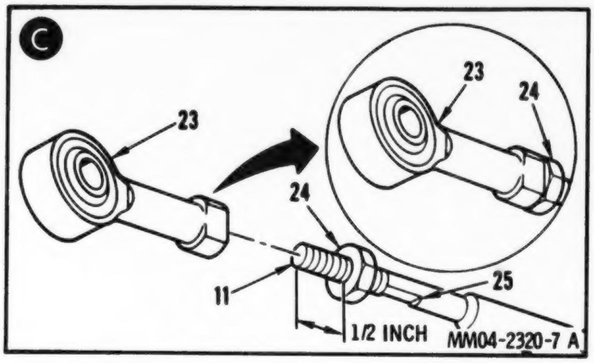
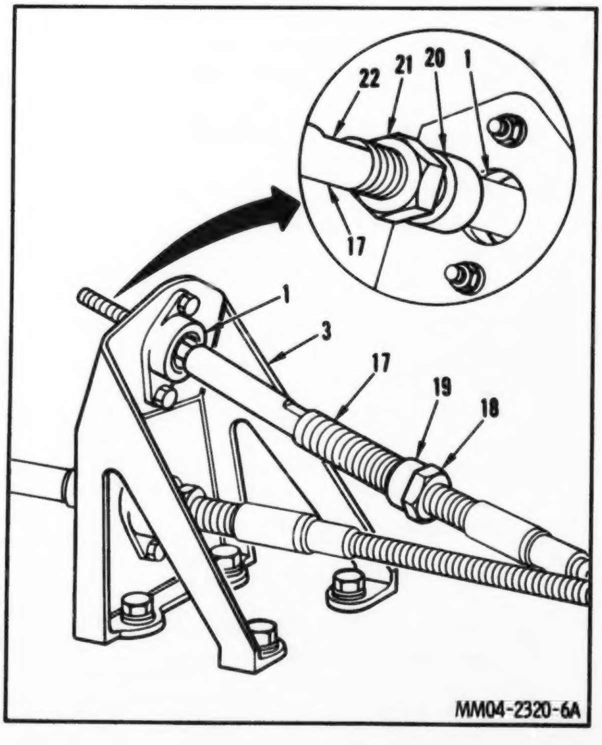
4-8-15. ENGINE LOAD DEMAND SPINDLE CABLE SUPPORT INSTALLATION (cont) 4-8-15

4. **Install No. 1 engine LDS forward cable (17) in support (3).** Torque nuts (18) and (21) to **100 INCH-POUNDS.**
   a. Center nut (18) on threaded area of cable (17).
   b. Slide spacer (19) on cable (17).
   c. Insert cable (17) through upper retainer (1).
   d. Slide spacer (20) on cable (17).
   e. Install nut (21) on cable (17). Turn nut until spacer (20) contacts retainer (1).
   f. Hold cable flats (22).
   g. Torque nuts (18) and (21) to **100 INCH-POUNDS.** Use 1/4 drive torque wrench (30-150 inch-pounds).
5. **Install rod end (23) on cable (11).** Torque nut (24) to **20 INCH-POUNDS.**
   a. Install nut (24) on cable (11).
   b. Install rod end (23) **1/2-INCH** onto cable (11). Aline as shown.
   c. Hold cable flats (25).
   d. Torque nut (24) to **20 INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 inch-pounds).





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4-8-15. ENGINE LOAD DEMAND SPINDLE CABLE SUPPORT INSTALLATION (cont) 4-8-15

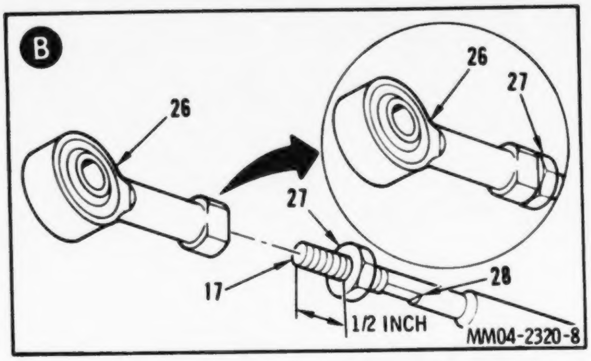
6. **Install rod end (26) on cable (17). Torque nut (27) to 20 INCH-POUNDS.**

   a. Install nut (27) on cable (17).

   b. Install rod end (26) **1/2-INCH** on cable (17). Aline as shown.

   c. Hold cable flats (28).

   d. Torque nut (27) to **20 INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 inch-pounds).

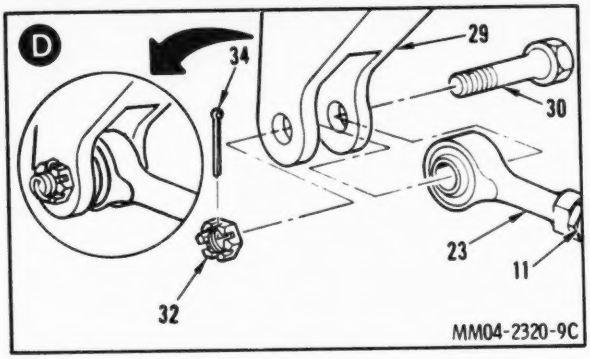


7. **Connect cable (11) to bellcrank (29).**

   a. Aline rod end (23) in bellcrank (29).

   b. Insert bolt (30) through bellcrank (29) and rod end (23).

   c. Install nut (32) on bolt (30).



8. **Torque nut (32) 14 to 18 INCH-POUNDS and install cotter pin (34).**

   a. Hold bolt (30). Install nut (32).

   b. Torque nut (32) to **14 INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 inch-pounds).

   c. Increase torque to aline cotter pin holes but do not exceed **18 INCH-POUNDS.**

   d. Install new cotter pin (34).

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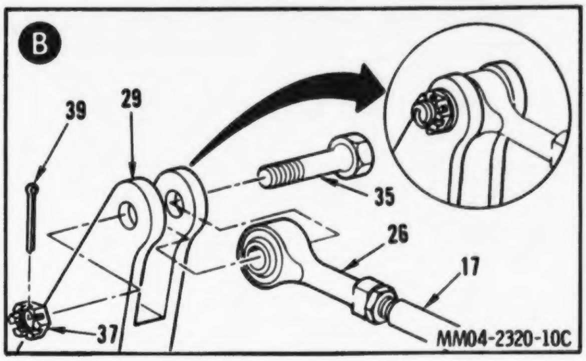
4-8-15. ENGINE LOAD DEMAND SPINDLE CABLE SUPPORT INSTALLATION (cont) 4-8-15



9. **Connect cable (17) to bellcrank (29).**
   - a. Aline rod end (26) in bellcrank (29).
   - b. Insert bolt (35) through bellcrank (29) and rod end (26).
   - c. Install new nut (37) on bolt (35).
10. **Torque nut (37) 14 to 18 INCH-POUNDS and install cotter pin (39).**
    - a. Hold bolt (35). Install nut (37).
    - b. Torque nut (37) to **14 INCH-POUNDS.**
    - c. Increase torque to aline cotter pin holes but do not exceed **18 INCH-POUNDS.**
    - d. Install new cotter pin (39).
11. **Inspect (TI).**
12. **Perform load demand spindle rigging check** (para 4-8-33).
13. **Secure access panel L200** (para 2-2-2).
14. **Perform power plant operational check (engine 1 and engine 2)** (TM 55-1520-238-T).

END OF TASK

4-8-16. NO. 1 ENGINE POWER AVAILABLE SPINDLE CABLE REMOVAL (PILOT TO CPG) 4-8-16

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

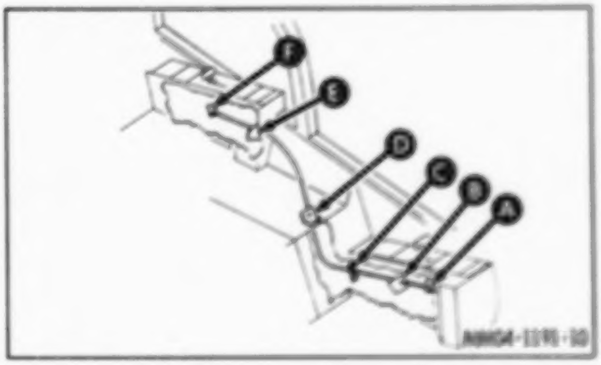
67R10 Attack Helicopter Repairer

References:

TM 9-1090-208-23-1

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Console panels PL1, PL3, and PL5 removed Console panels CL1 and CL3 removed
TM 9-1090-208-23-1	Aerial rocket control and display panel removed 30mm aircraft gun, gun turret, and flexible chute removed



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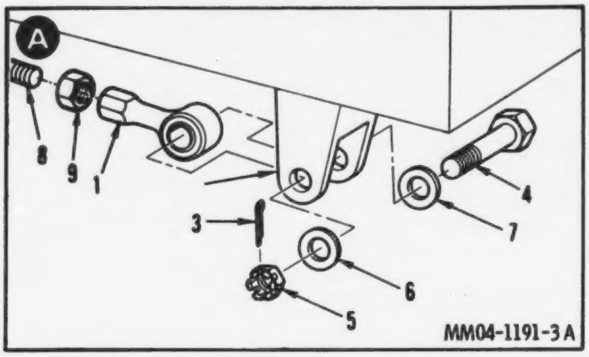
4-8-16. NO. 1 ENGINE POWER AVAILABLE SPINDLE CABLE REMOVAL (PILOT TO CPG) (cont)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1. Enter CPG station (para 1-7-1). Observe all safety precautions.

2. **Remove rod end (1) from CPG No. 1 power lever (2).**

   a. Remove cotter pin (3).

   b. Hold bolt (4).

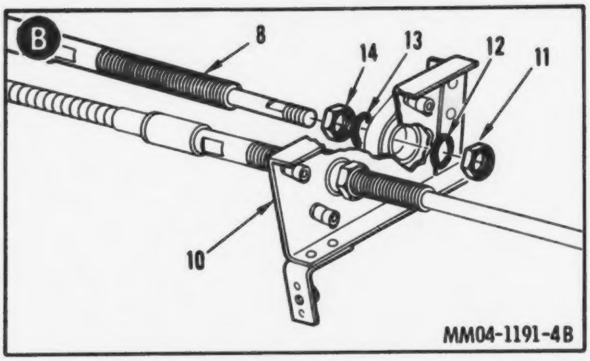
   c. Remove nut (5) and washer (6).

   d. Remove bolt (4) and washer (7).

3. **Remove rod end (1) from cable (8).**

   a. Hold rod end (1) and loosen nut (9).

   b. Remove rod end (1) and nut (9) from cable (8).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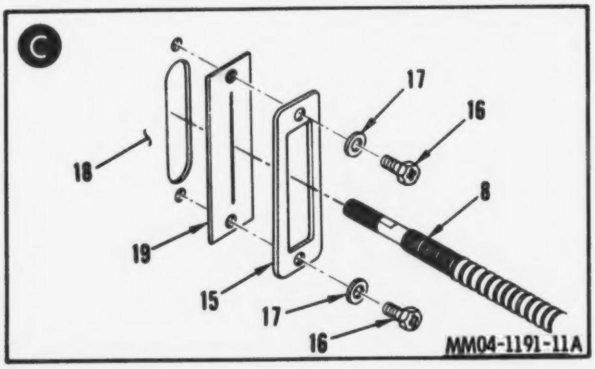
4. **Remove cable (8) from bracket (10).**

   a. Hold cable (8). Remove nut (11). Remove spacer (12).

   b. Pull cable (8) out of bracket (10).

   c. Remove spacer (13) and nut (14) from cable (8).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5. **Remove retainer (15) from cable (8).**

   a. Remove two screws (16) and washers (17) from CPG bulkhead (18).

   b. Remove retainer (15) and seal (19) from cable (8).

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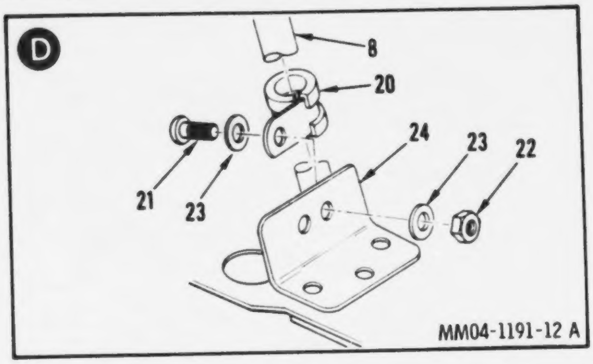
4-8-16. NO. 1 ENGINE POWER AVAILABLE SPINDLE CABLE REMOVAL (PILOT TO CPG) (cont) 4-8-16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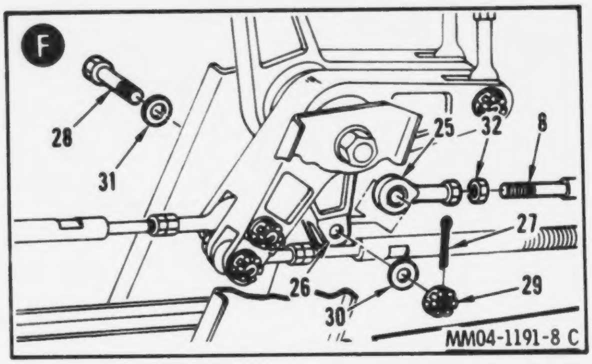
6. **Remove clamp (20) from cable (8).**

   a. Hold screw (21). Remove nut (22) and washer (23).

   b. Remove screw (21), washer (23), and clamp (20) from bracket (24).

   c. Remove clamp (20) from cable (8).

7. **Enter pilot station (para 1-7-1). Observe all safety precautions.**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MM04-1191-8 C

8. **Remove rod end (25) from pilot No. 1 power lever (26).**

   a. Remove cotter pin (27).

   b. Hold bolt (28).

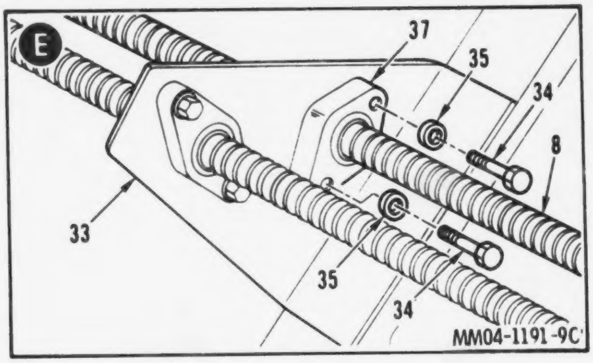
   c. Remove nut (29) and washer (30).

   d. Remove bolt (28) and washer (31).

9. **Remove rod end (25) from cable (8).**

   a. Hold cable (8). Loosen nut (32).

   b. Remove rod end (25) and nut (32) from cable (8).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MM04-1191-9C

10. **Remove cable (8) from bracket (33).**

    a. Remove two bolts (34) and washers (35) from bearing retainer (37).

    b. Pull cable (8) out of bracket (33).

GO TO NEXT PAGE

4-8-16. NO 1 ENGINE POWER AVAILABLE SPINDLE CABLE REMOVAL (PILOT TO CPG) (cont)

B. CLEANING

Clean rod end, cable support, and support bracket (para 1-5-36).

C. INSPECTION

1. Check rod end for thread damage and bearing surface scars.
   None allowed.
2. Check cable support and support bracket for cracks.
   None allowed.
3. Check rod end, cable support, and support bracket for corrosion (para 1-5-38).

END OF TASK

4-8-17. NO. 1 ENGINE POWER AVAILABLE SPINDLE CABLE INSTALLATION (PILOT TO CPG) 4-8-17

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Scale, Dial Indicating	6670-00-240-5821
Wrench, Torque 1/4 Drive	5120-00-117-4832

Materials/Parts:

Cotter Pin (2)

Personnel Required:

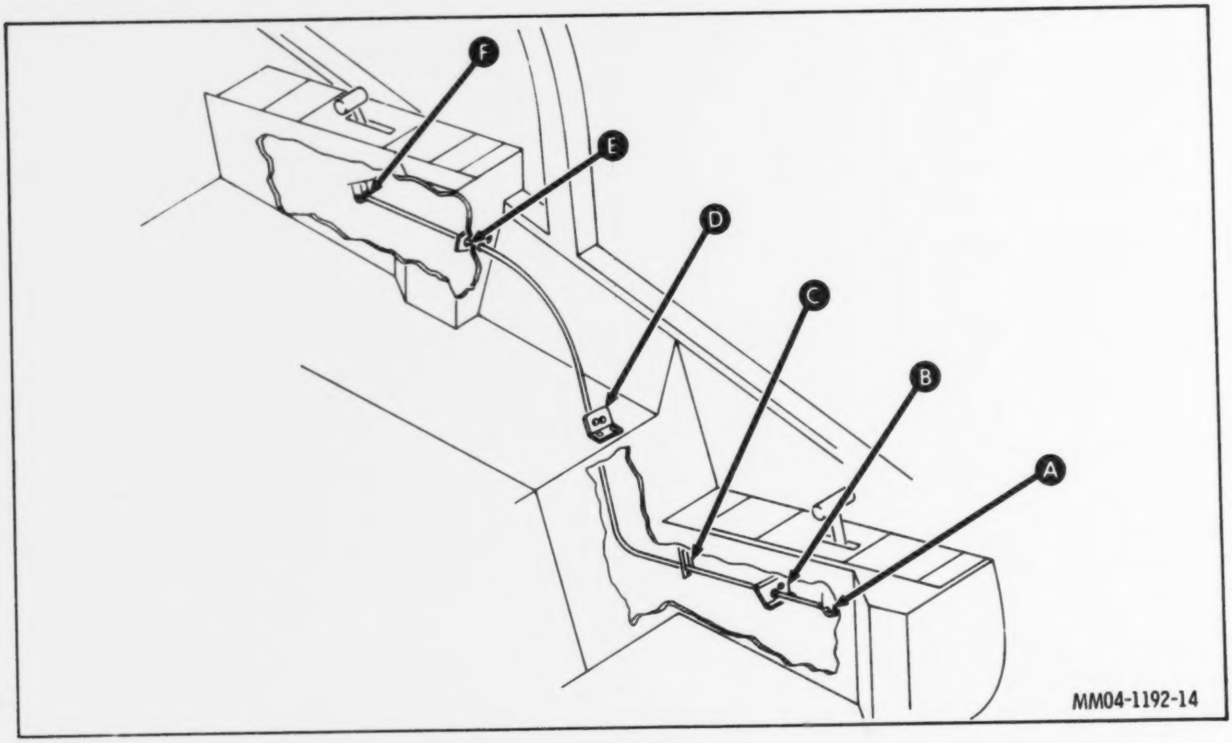
67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

References:

TM 9-1090-208-23-1

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



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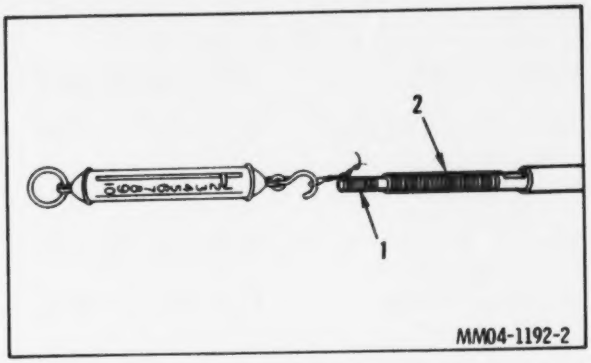
4-8-17. NO. 1 ENGINE POWER AVAILABLE SPINDLE CABLE INSTALLATION (PILOT TO CPG) (cont) 4-8-17

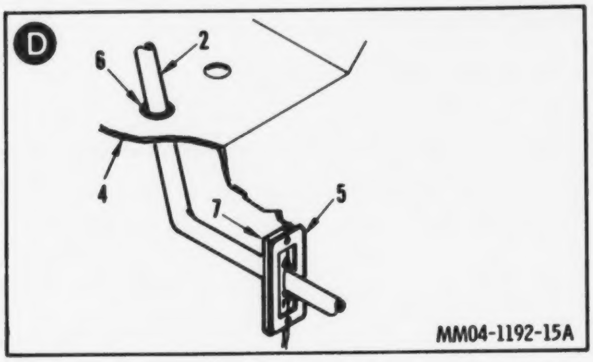
1. **Check cable ribbon (1) friction load.**
   a. Place cable (2) on flat surface. Be sure cable (2) is not bent or twisted.
   b. Check friction load of ribbon (1). Friction load not to exceed **1-1/2 POUNDS**. Use dial-indicating scale. If friction load exceeds **1-1/2 POUNDS**, replace ribbon (1).



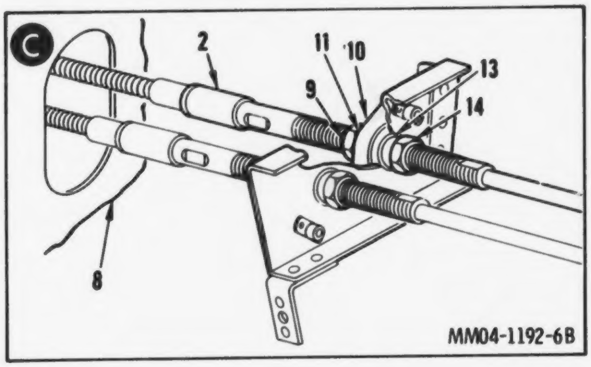
2. **Enter CPG station** (para 1-7-1). **Observe all safety precautions.**

CAUTION

To prevent damage to cable, avoid sharp bends which could result in kinking of cable.



3. **Route cable (2) through pilot floor (4).**
   a. Insert cable (2) through pilot floor (4).
   b. Position grommet (6) around cable (3) in pilot floor (4).
   c. Insert retainer (5) and seal (7) on cable (2).



4. **Route cable (2) through CPG bulkhead (8).** Install spacer (10) and nut (9) on cable (2).

5. **Route cable (2) through bearing (11) and bracket (12).** Install spacer (13) and nut (14) on cable (2).

GO TO NEXT PAGE

4-8-17. NO. 1 ENGINE POWER AVAILABLE SPINDLE CABLE INSTALLATION (PILOT TO CPG) (cont) 4-8-17

6. **Install rod end (15) on cable (2).** Torque nut (16) to **20 INCH-POUNDS.**

   a. Install nut (16) on cable (2).

   b. Install rod end (15) on cable (2) to depth of **1/2 INCH.**

   c. Hold rod end (15). Torque nut (16) to **20 INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 inch-pounds).

7. **Connect rod end (15) to CPG No. 1 power lever (17).** Torque nut (18) **14 to 18 INCH-POUNDS.**

   a. Install bolt (19) through washer (20), power lever (17) and rod end (15).

   b. Install washer (20) and nut (18) on bolt (19).

   c. Hold bolt (19). Torque nut (18) to **14 INCH-POUNDS.**

   d. Increase torque to aline cotter pin holes, but do not exceed **18 INCH-POUNDS.**

   e. Install new cotter pin (21).

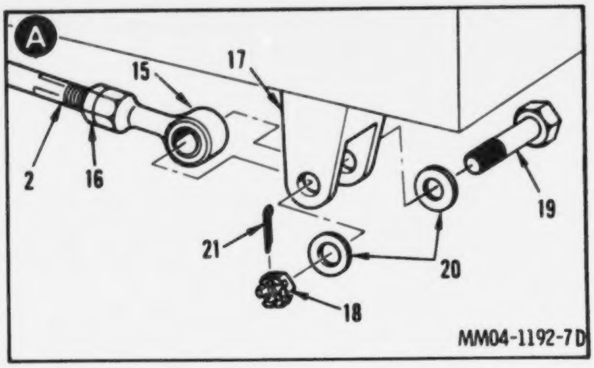
8. **Adjust cable (2) travel.** Torque nuts (9) and (14) to **90 INCH-POUNDS.**

   a. Place CPG No. 1 power lever (22) to IDLE.

   b. Measure cable travel from center of bolt (19) to shoulder of cable (23).

   c. Adjust nuts (9) and (14) to obtain **5.90 INCHES** of travel.

   d. Torque nuts (9) and (14) to **90 INCH-POUNDS.** Use 1/4 drive torque wrench (30-150 inch-pounds).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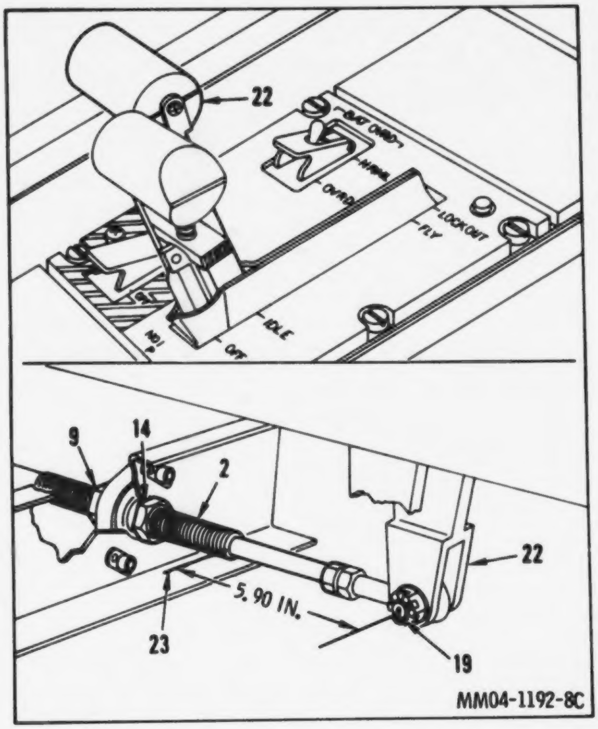
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4-8-17. NO. 1 ENGINE POWER AVAILABLE SPINDLE CABLE INSTALLATION (PILOT TO CPG) (cont) 4-8-17

9. **Install retainer (5) and seal (6) on CPG bulkhead (8).**

    a. Position seal (7) inside retainer (5).

    b. Aline holes of retainer (5) and seal (7) with holes (24) on CPG bulkhead (8).

    c. Install two screws (26) through washers (25), retainer (5), seal (7), into CPG bulkhead (8).

10. **Enter pilot station** (para 1-7-1). **Observe all safety precautions.**

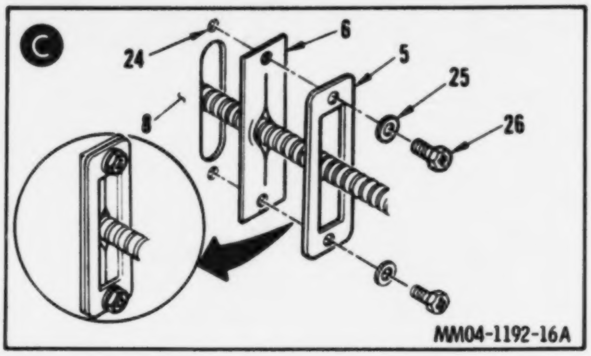
11. **Install cable (2) through bracket (27).**

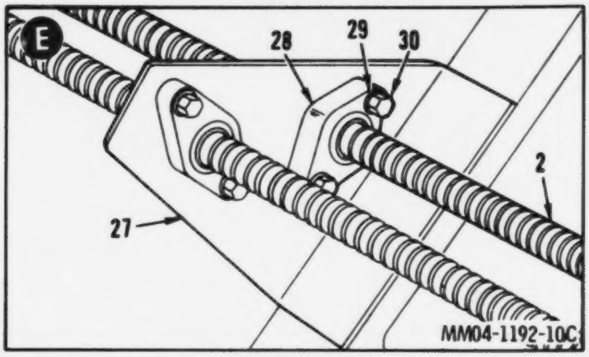
    a. Push cable (2) through bracket (27) until bearing retainer (28) is in place.

    b. Aline two holes in bracket (27) with two holes in bearing retainer (28).

    c. Install two washers (29) on two bolts (30).

    d. Install two bolts (30).





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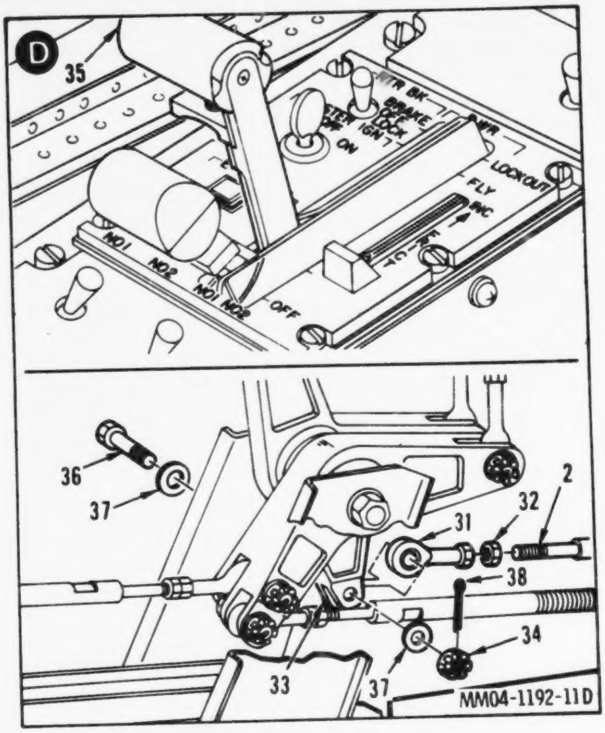
4-8-17. NO. 1 ENGINE POWER AVAILABLE SPINDLE CABLE INSTALLATION (PILOT TO CPG) (cont)



12. **Install rod end (31) on cable (2). Torque nut (32) to 20 INCH-POUNDS.**

    a. Install nut (32) on cable assembly (2).

    b. Install rod end (31) on cable (2) to a depth of **1/2-INCH.** Aline rod end (31) with bellcrank (33).

    c. Hold rod end (31).

    d. Torque nut (32) to **20 INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 inch-pounds).

13. **Connect rod end (31) to bellcrank** (33). Torque nut (34) **14 to 18 INCH-POUNDS.**

    a. Place pilot No. 1 power lever (35) to IDLE

    b. Install bolt (36) through washer (37), bellcrank (33), and rod end (31).

    c. Hold bolt (36).

    d. Install nut (34) and washer (37).

    e. Torque nut (34) to **14 INCH-POUNDS.** Use 1/2 drive torque wrench (0-30 inch-pounds).

    f. Increase torque to aline cotter pin holes, but do not exceed **18 INCH-POUNDS.**

    g. Install new cotter pin (38).

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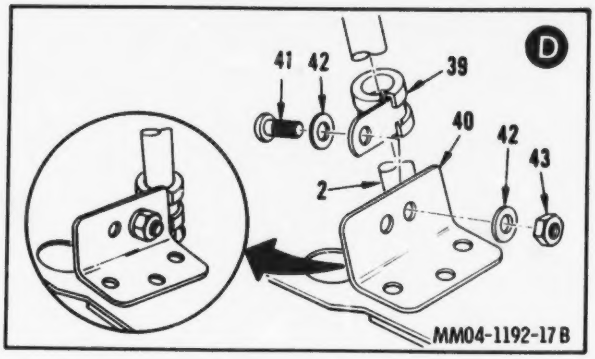
4-8-17. NO. 1 ENGINE POWER AVAILABLE SPINDLE CABLE INSTALLATION (PILOT TO CPG) (cont) 4-8-17



14. **Install clamp (39) on bracket (40).**

    a. Aline clamp (39) with bracket (40).

    b. Install screw (41) through washer (42), clamp (39) and bracket (40).

    c. Install washer (42) and nut (43) on screw (41).

    d. Hold screw (41). Tighten nut (43).

15. **Inspect (TI).**

16. **Perform cable rig check (para 4-8-36).**

17. **Install flexible chute, gun turret, 30mm aircraft gun, and aerial rocket control and display panel (TM 9-1090-208-23-1).**

18. **Install console panels PL1, PL3, and PL5 (para 2-2-2).**

19. **Install console panels CL1 and CL3 (para 2-2-2).**

END OF TASK

4-8-18. NO. 2 ENGINE POWER AVAILABLE SPINDLE CABLE REMOVAL (PILOT TO CPG) 4-8-18

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

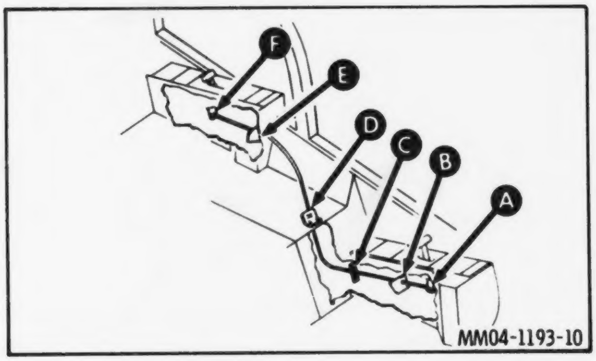
67R10 Attack Helicopter Repairer

References:

TM 9-1090-208-23-1

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Console panels PL1, PL3, and PL5 removed Console panels CL1 and CL3 removed
TM 9-1090-208-23-1	Aerial rocket control, display panel, gun turret, and ammunition feed chute removed.



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4-8-18. NO. 2 ENGINE POWER AVAILABLE SPINDLE CABLE REMOVAL (PILOT TO CPG) (cont) 4-8-18

1. **Enter CPG station (para 1-7-1). Observe all safety precautions.**

2. **Remove rod end (1) from CPG No. 2 power lever (2).**

   a. Remove cotter pin (3).

   b. Hold bolt (4).

   c. Remove nut (5) and washer (6).

   d. Remove bolt (4) and washer (7).

3. **Remove rod end (1) from cable (8).**

   a. Hold rod end (1). Loosen nut (9).

   b. Remove rod end (1) and nut (9) from cable (8).

4. **Remove cable (8) from bracket (10).**

   a. Hold cable (8). Remove nut (11). Remove spacer (12).

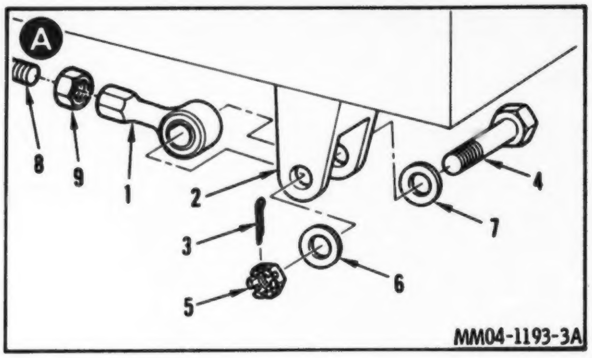
   b. Pull cable (8) out of bracket (10).

   c. Remove spacer (13) and nut (14) from cable (8).

5. **Remove retainer (15) from cable (8).**

   a. Remove two screws (16) and washers (17) from CPG bulkhead (18).

   b. Remove retainer (15) and seal (19) from cable (8).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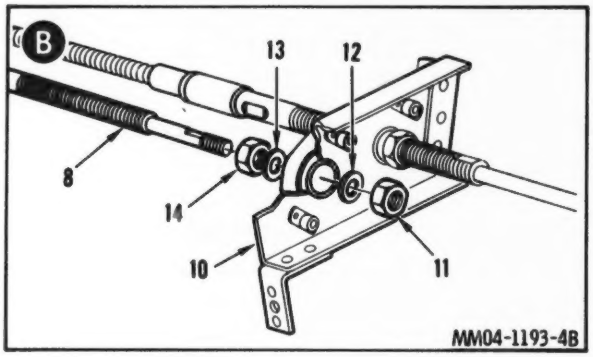
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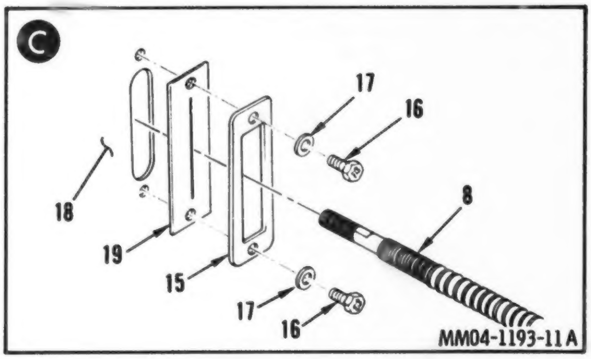
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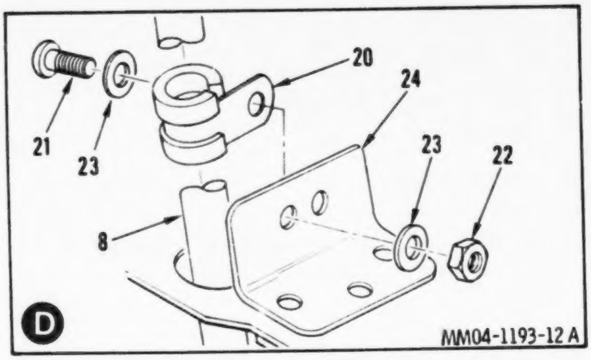
4-8-18. NO. 2 ENGINE POWER AVAILABLE SPINDLE CABLE REMOVAL (PILOT TO CPG) (cont)

6. **Remove clamp (20) from cable (8).**
   a. Hold screw (21). Remove nut (22) and washer (23).
   b. Remove screw (21), washer (23), and clamp (20) from bracket (24).
   c. Remove clamp (20) from cable (8).
7. **Enter pilot station** (para 1-7-1). **Observe all safety precautions.**
8. **Remove rod end (25) from pilot No. 2 power lever (26).**
   a. Remove cotter pin (27).
   b. Hold bolt (28).
   c. Remove nut (29) and washer (30).
   d. Remove bolt (28).
9. **Remove rod end (25) from cable (8).**
   a. Hold cable (8). Loosen nut (31).
   b. Remove rod end (25) and nut (31) from cable (8).
10. **Remove cable (8) from bracket (32).**
    a. Remove two bolts (33) and washers (34) from bearing retainer (35).
    b. Pull cable (8) out of bracket (32).
    c. Remove cable (8).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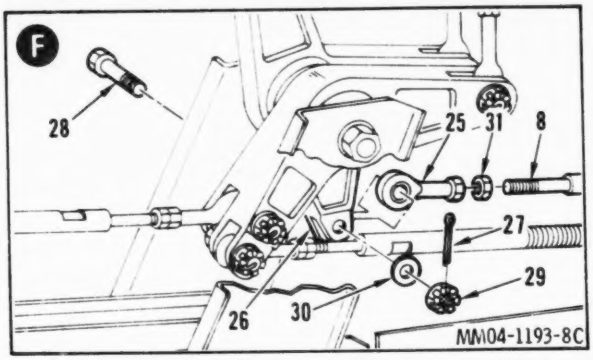
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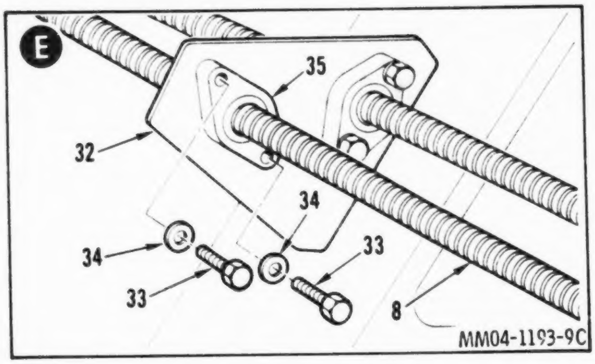
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4-8-18. NO. 2 ENGINE POWER AVAILABLE SPINDLE CABLE REMOVAL (PILOT TO CPG) (cont)

B. CLEANING

Clean rod end, cable support, and support bracket (para 1-5-30).

C. INSPECTION

1. Check rod end for thread damage and bearing surface scars. None allowed.
2. Check cable support and support bracket for cracks. None allowed.
3. Check rod end, cable support and support bracket for corrosion (para 1-5-38).

END OF TASK

4-8-19. NO. 2 ENGINE POWER AVAILABLE SPINDLE CABLE INSTALLATION (PILOT TO CPG)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Wrench, Torque 1/4 Drive	5120-00-117-4832
Scale, Dial Indicating	6670-00-240-5821

Materials/Parts:

Cotter Pin (2)

Personnel Required:

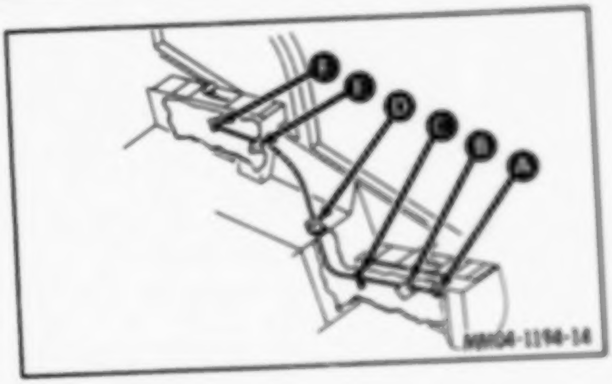
67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

References:

TM 9-1090-208-23-1

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



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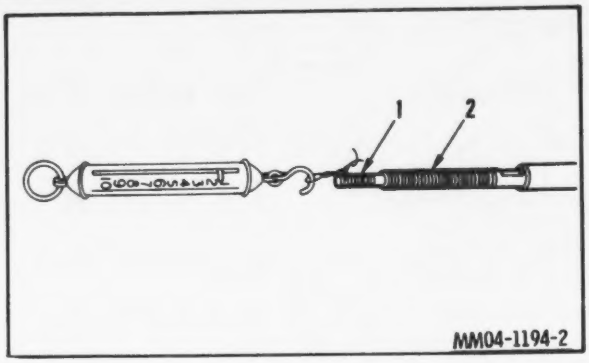
4-8-19. NO. 2 ENGINE POWER AVAILABLE SPINDLE CABLE INSTALLATION (PILOT TO CPG) (cont)

1. **Check cable ribbon (1) friction load.**

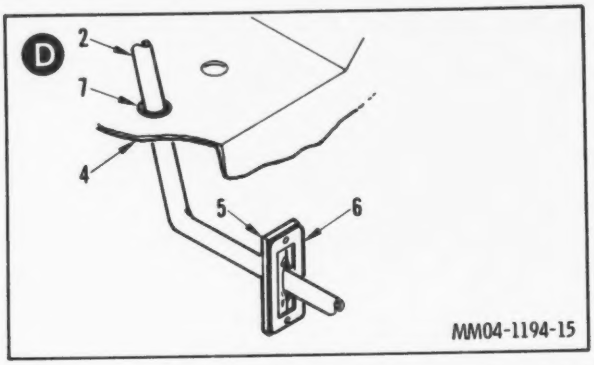
   a. Place cable (2) on flat surface. Be sure cable (2) is not bent or twisted.

   b. Check friction load of ribbon (1). Friction load not to exceed **1-1/2 POUNDS.** Use dial-indicating scale.



MM04-1194-2

2. **Enter CPG station** (para 1-7-1). **Observe all safety precautions.**



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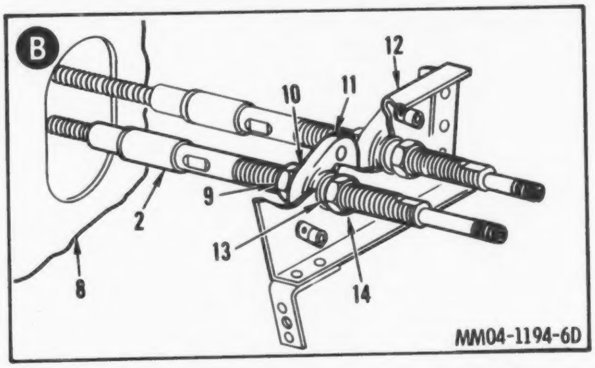
CAUTION

To prevent damage to cable, avoid sharp bends which could result in kinking of cable.

3. **Route cable (2) through pilot floor (4).** Insert retainer (5) and seal (6) on cable (2). Insert grommet (7) around cable (2) and into pilot floor (4).

4. **Route cable (2) through CPG bulkhead (8).** Install nut (9) and spacer (10) on cable (2).



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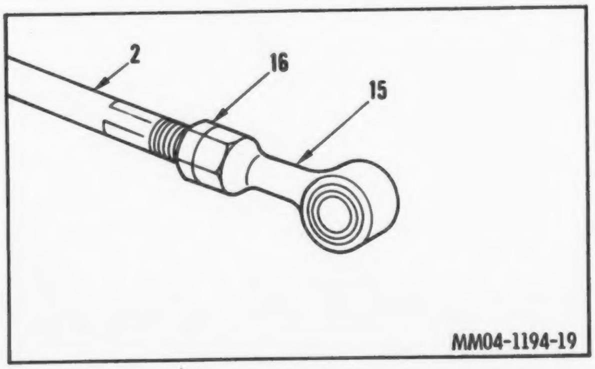
5. **Route cable (2) through bearing (11) and bracket (12).** Install spacer (13) and nut (14) on cable (2).

6. **Install rod end (15) on cable (2). Torque nut (16) to 20 INCH-POUNDS.**

   a. Install nut (16) on cable (2).

   b. Install rod end (15) on cable (2) to depth of **1/2 INCH.**

   c. Hold rod end (15). Torque nut (16) to 20 INCH-POUNDS (0 to 30 inch-pounds).



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4-8-19. NO. 2 ENGINE POWER AVAILABLE SPINDLE CABLE INSTALLATION (PILOT TO CPG) (cont)

7. **Connect rod end (15) to CPG No. 2 power lever (17). Torque nut (18) 14 to 18 INCH-POUNDS.**

   a. Install bolt (19) through power lever (17) and rod end (15).

   b. Install washer (20) and nut (18) on bolt (19).

   c. Hold bolt (19). Torque nut (18) to 14 INCH-POUNDS (0-30 inch-pounds).

   d. Increase torque to aline cotter pin hole, but do not exceed **18 INCH-POUNDS.**

   e. Install new cotter pin (21).

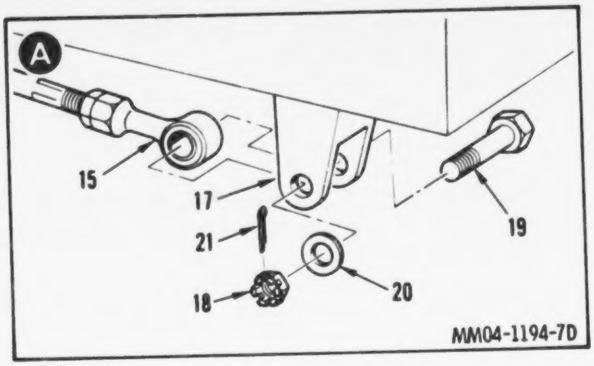
8. **Adjust cable (2) travel to obtain 5.90 INCHES of travel.** Torque nuts (9) and (14) to **90 INCH-POUNDS.**

   a. Place power lever (22) in IDLE position.

   b. Measure cable travel from center of bolt (19) to shoulder of cable (23).

   c. Adjust nuts (9) and (14) to obtain **5.90 INCHES** of travel.

   d. Torque nuts (9) and (14) to **90 INCH-POUNDS** (30-150 inch pounds).



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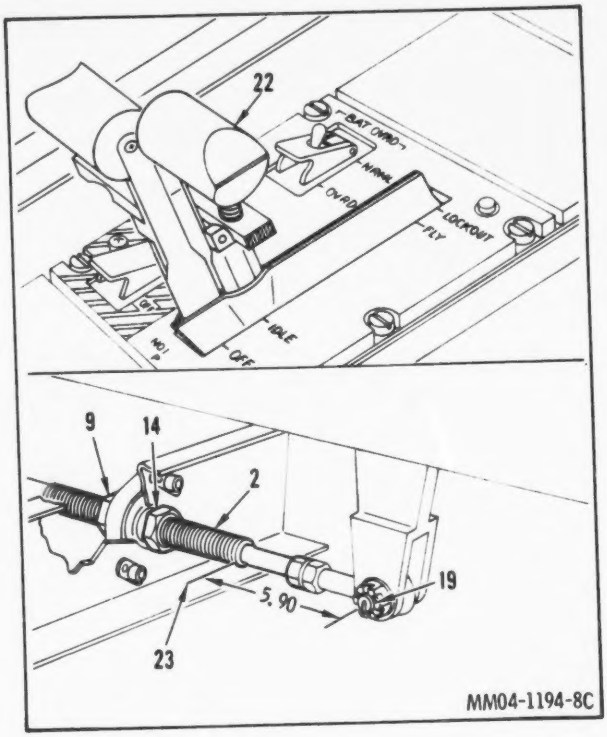

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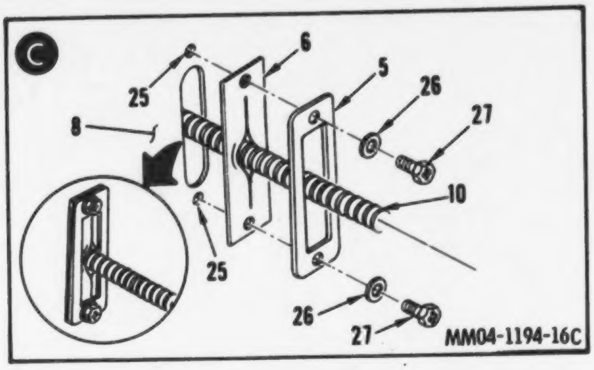
4-8-19. NO. 2 ENGINE POWER AVAILABLE SPINDLE CABLE INSTALLATION (PILOT TO CPG) (cont) 4-8-19

9. **Install retainer (5) and seal (6) on CPG bulkhead (8).**

   a. Position seal (6) on retainer (5).

   b. Aline holes of retainer (5) and seal (6) with holes (25) on CPG bulkhead (8).

   c. Install two screws (27) through washers (26), retainer (5), and seal (6) into CPG bulkhead (8).



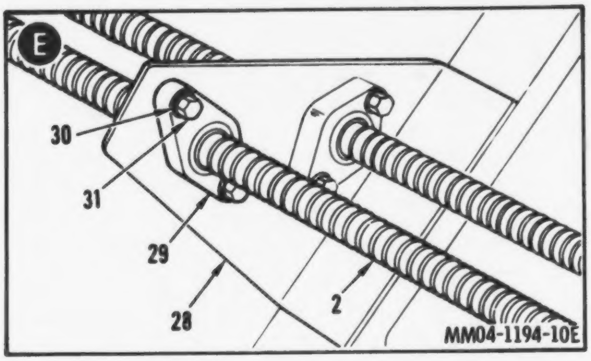
10. **Enter pilot station** (para 1-7-1). **Observe all safety precautions.**

11. **Install cable (2) through bracket (28).**

    a. Push cable (2) through bracket (28) until bearing retainer (29) on cable (2) is in place.

    b. Aline two holes in bracket (28) with holes in bearing retainer (29).

    c. Install two washers (30) and bolts (31) in bracket (28).



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4-8-19. NO. 2 ENGINE POWER AVAILABLE SPINDLE CABLE INSTALLATION (PILOT TO CPG) (cont)

12. **Install rod end (32) on cable (2).** Torque nut (33) **to 20 INCH-POUNDS.**

    a. Install nut (33) on cable (2).

    b. Install rod end (32) on cable (2) to a depth of **1/2-INCH.** Aline rod end (32) with bellcrank (34).

    c. Hold rod end (32).

    d. Torque nut (33) to **20 INCH-POUNDS** (0-30 INCH-POUNDS).

13. **Connect rod end (32) to bellcrank (34).** Torque nut (35) **14 to 18 INCH-POUNDS.**

    a. Place pilot power lever (36) in IDLE position.

    b. Install bolt (37) through bellcrank (34) and rod end (32).

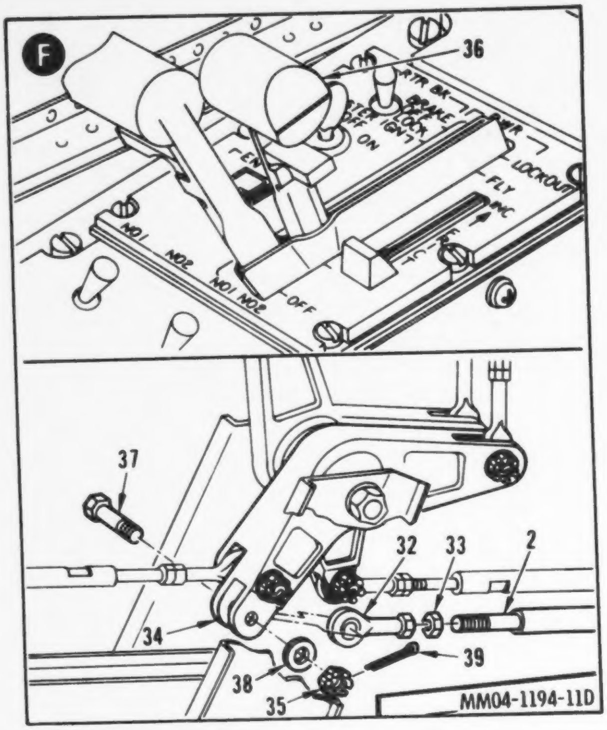
    c. Hold bolt (37).

    d. Install nut (35) with washer (38).

    e. Torque nut (35) to **14 INCH-POUNDS** (0-30 INCH-POUNDS).

    f. Increase torque to aline cotter pin hole, but do not exceed **18 INCH-POUNDS.**

    g. Install new cotter pin (39).


F
36
RTR BK
BRAKE
LOCK
LIGHT
ON
PWR
LOCKOUT
FLY
NO1
NO2
NO1 NO2
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MM04-1194-11D

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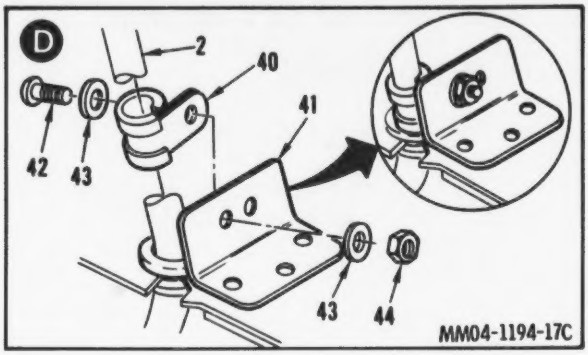
4-8-19. NO. 2 ENGINE POWER AVAILABLE SPINDLE CABLE INSTALLATION (PILOT TO CPG) (cont) 4-8-19



14. **Install clamp (40) on bracket (41).**

    a. Position clamp (40) on cable (2).

    b. Aline clamp (40) with bracket (41).

    c. Install screw (42) through washer (43), clamp (40), and bracket (41).

    d. Install washer (43) and nut (44) on screw (42).

    e. Hold screw (42). Tighten nut (44).

15. **Inspect (TI).**

16. **Perform cable rig check** (para 4-8-37).

17. **Install gun turret, ammunition feed chute, and aerial rocket control and display panel** (TM 9-1090-208-23-1).

18. **Install console panels PL1, PL3, and PL5** (para 2-2-2).

19. **Install console panels CL1 and CL3** (para 2-2-2).

END OF TASK

4-8-20. PILOT POWER QUADRANT REMOVAL

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R10 Attack Helicopter Repairer

References:

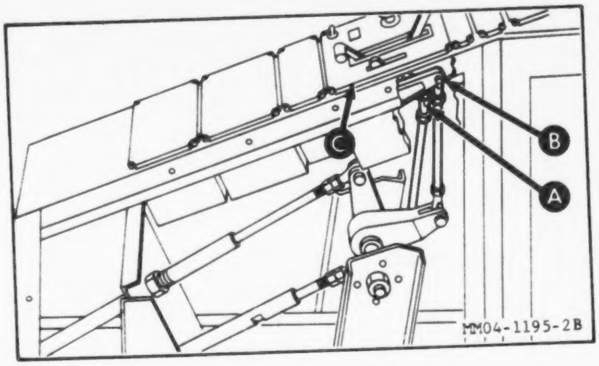
TM 55-1500-323-24

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-3-12	Pilot seat removed
2-2-2	Console panels PL1 and PL3 removed

A. REMOVAL

1. Enter pilot station (para 1-7-1). Observe all safety precautions.
2. On pilot forward circuit breaker panel, open EMER HYD, RTR BRK, and LT ENG START circuit breakers.
3. On pilot center circuit breaker panel, OPEN LT PRI circuit breaker.



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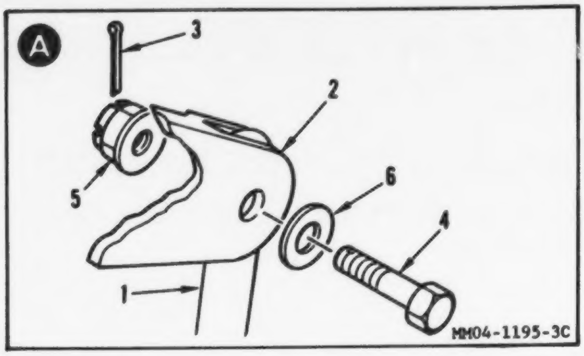
4-8-20. PILOT POWER QUADRANT REMOVAL (cont) 4-8-20

5. **Disconnect rod end (1) from No. 1 lever (2).**
   a. Position power lever (2) in LOCKOUT position.
   b. Remove and discard cotter pin (3).
   c. Hold bolt (4).
   d. Remove nut (5).
   e. Remove bolt (4) and washer (6) from power lever (2) and rod end (1).

6. **Disconnect rod end (7) from No. 2 power lever (8).**
   a. Remove and discard cotter pin (9).
   b. Hold bolt (10).
   c. Remove nut (11).
   d. Remove bolt (10) and washer (12) from power lever (8) and rod end (7).

7. **Remove quadrant (13) from console (14).**
   a. Unlock six Camloc fasteners (15).
   b. Lift power quadrant (13) from console (14).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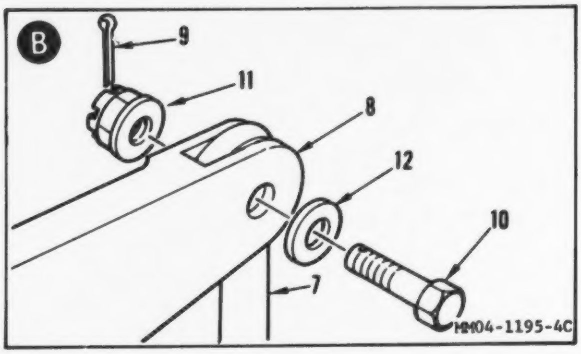
MM04-1195-3C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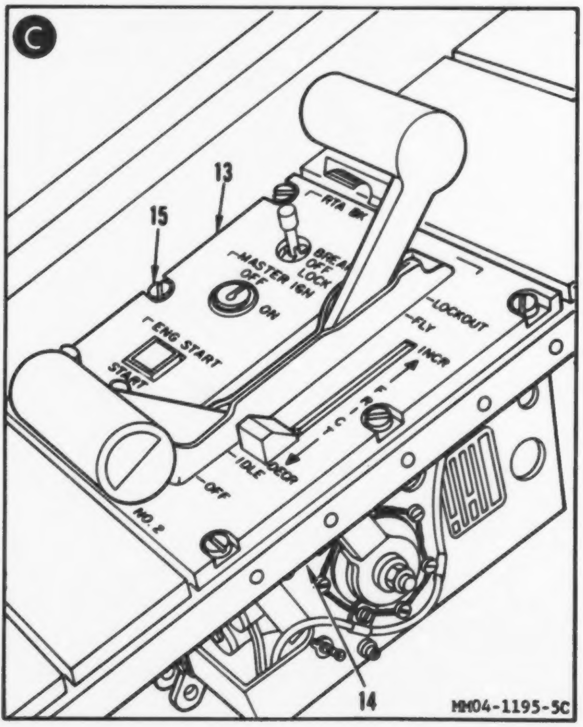
C
13
15
RTR BK
BRAKE OFF LOCK
MASTER IGN OFF ON
ENG START
START
LOCKOUT
FLY
INCR
DECR
IDLE
OFF
NO. 2
14
MM04-1195-5C

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4-8-20. PILOT POWER QUADRANT REMOVAL (cont) 4-8-20

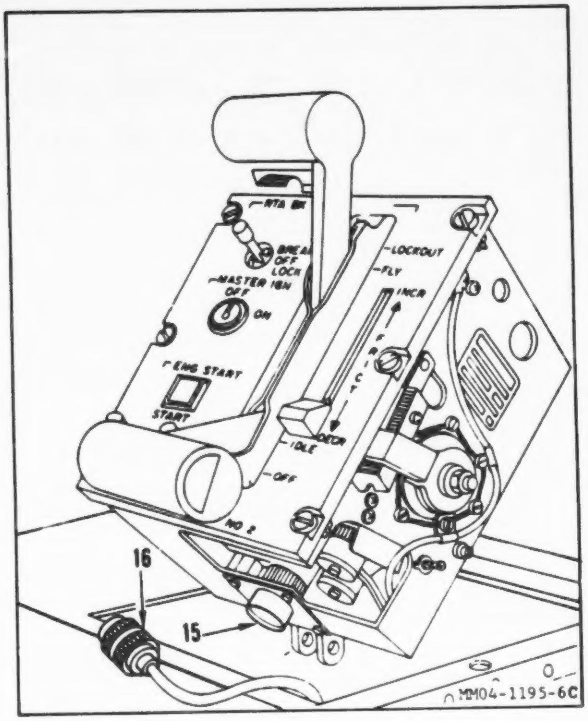
8. Detach connector P173 (16) from connector J1 (15).

B. CLEANING

Wipe all removed and attaching parts with clean rag.

C. INSPECTION

1. Check power quadrant for cracks. None allowed.
2. Check connectors P173 and J1 for damage (TM 55-1500-323-24).


BREA
OFF
LOCK
MASTER IGN
OFF
ON
ENG START
START
LOCKOUT
FLY
INCR
FRICT
DECR
IDLE
OFF
NO 2
16
15
MM04-1195-6C

END OF TASK

4-8-21. PILOT POWER QUADRANT INSTALLATION 4-8-21

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-117-4832

Materials/Parts:

Cotter Pin (2)

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

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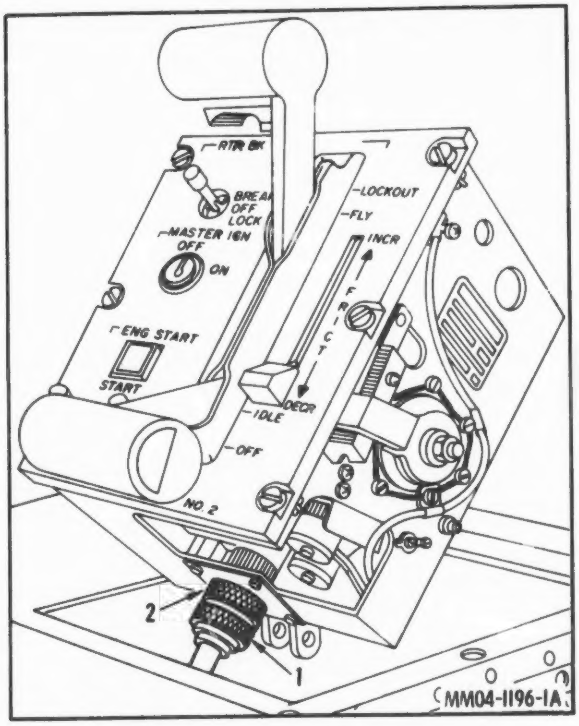
1. **Enter pilot station (para 1-7-1). Observe all safety precautions.**

2. **Attach connector P173 (1) to power quadrant connector J1 (2).**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BREAK
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LOCK
MASTER IGN
OFF
ON
ENG START
START
LOCKOUT
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INCR
FRICT
DECR
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1
MM04-1196-1A

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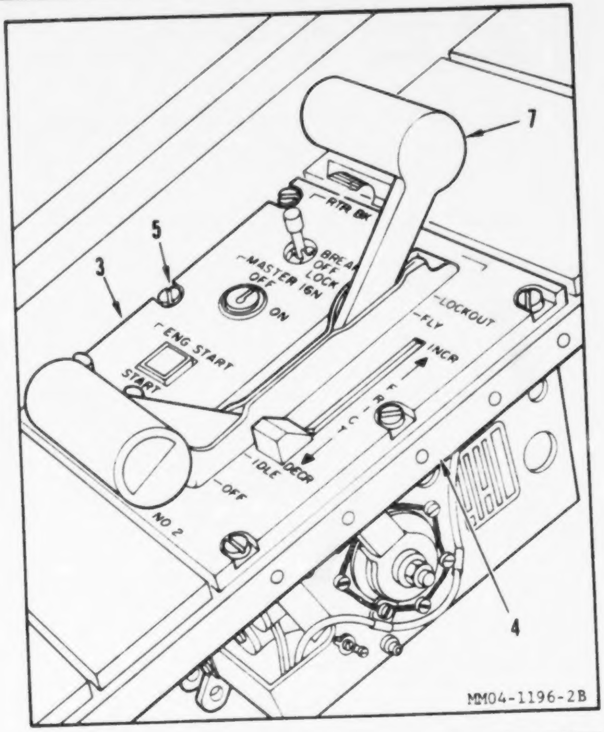
4-8-21. PILOT POWER QUADRANT INSTALLATION (cont)

3. **Install quadrant (3) in console (4).** Lock six Camloc fasteners (5).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RTR BK
5
3
BREAK
OFF
LOCK
MASTER IGN
OFF
ON
LOCKOUT
FLY
INCR
ENG START
START
DECR
IDLE
OFF
NO 2
4
MM04-1196-2B

4. **Connect rod end (6) to No. 1 power lever (7).**

   a. Position power lever (7) to **LOCKOUT.**

   b. Install bolt (8) through washer (9), power lever (7) and rod end (6).

   c. Hold bolt (8).

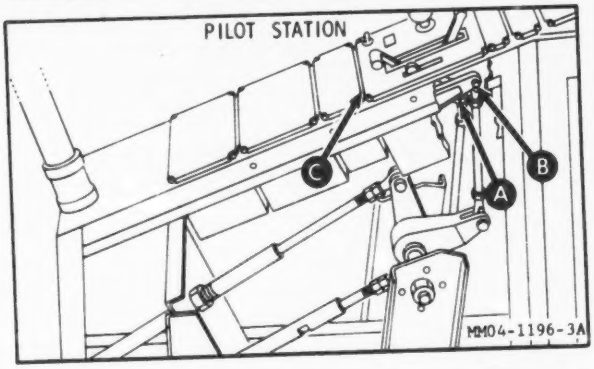
   d. Install nut (10) with washer (11) on bolt (8).

5. **Torque nut (10) 14 to 18 INCH-POUNDS**

   a. Hold bolt (8). Torque nut (10) to **14 INCH-POUNDS.**

   b. Increase torque to aline cotter pin hole, but do not exceed **18 INCH-POUNDS.**

   c. Install new cotter pin (12).


PILOT STATION
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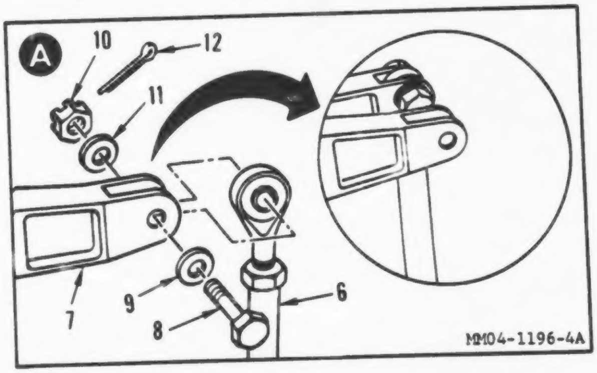
B
A
MM04-1196-3A


A
10
12
11
7
9
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6
MM04-1196-4A

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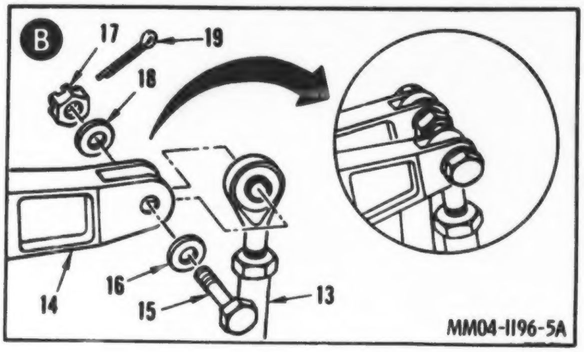
4-8-21. PILOT POWER QUADRANT INSTALLATION (cont) 4-8-21



6. **Connect rod end (13) to No. 2 power lever (14).**

   a. Install bolt (15) through washer (16), power lever (14), and rod end (13).

   b. Hold bolt (15).

   c. Install washer (18) and nut (17) on bolt (15).

7. **Torque nut (17) 14 to 18 INCH-POUNDS**

   a. Hold bolt (15). Torque nut (17) to 14 **INCH-POUNDS.**

   b. Increase torque to aline cotter pin holes, but do not exceed **18 INCH-POUNDS.**

   c. Install new cotter pin (19).

8. **Inspect (TI).**

9. **Perform power plant operational check (engine No. 1 and engine No. 2)** (TM 55-1520-238-T).

10. **Install panels PL1 and PL3** (para 2-2-2).

END OF TASK

4-8-22. CPG POWER QUADRANT REMOVAL 4-8-22

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R10 Attack Helicopter Repairer

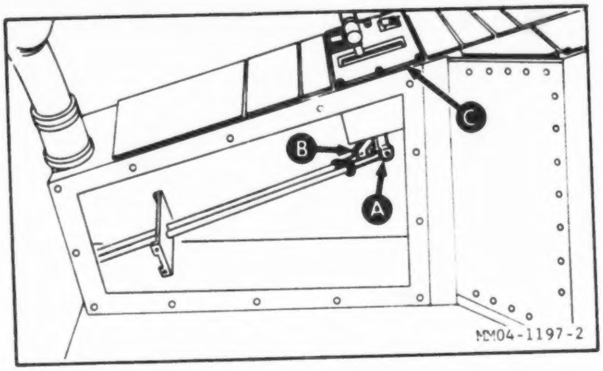
References:

TM 55-1500-323-24

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Console panels CL1 and CL3 removed

1. Enter pilot station (para 1-7-1). Observe all safety precautions.
2. On pilot forward circuit breaker panel, open EMER HYD and THROT SOL circuit breakers.
3. Enter CPG station (para 1-7-1). Observe all safety precautions.
4. On CPG circuit breaker panel, open PRI LT circuit breaker.



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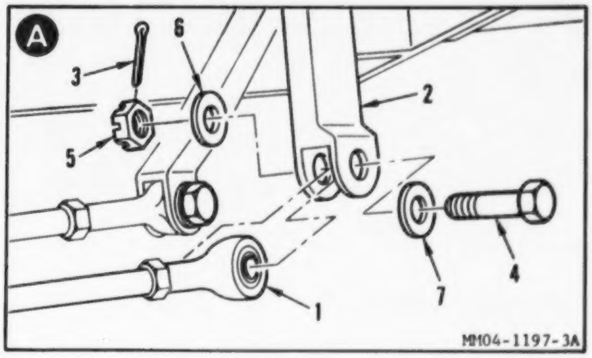
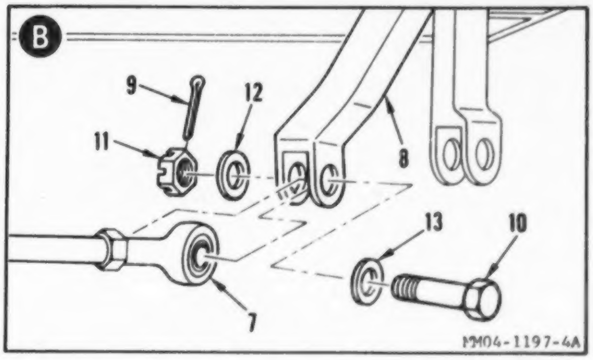
4-8-22. CPG POWER QUADRANT REMOVAL (cont) 4-8-22


A
3
6
2
5
7
4
1
MM04-1197-3A

5. **Disconnect rod end (1) from No. 2 power lever (2).**
   a. Position No. 2 power lever (2) in IDLE position.
   b. Remove and discard cotter pin (3).
   c. Hold bolt (4).
   d. Remove nut (5) and washer (6).
   e. Remove bolt (4) and washer (7) from power lever (2) and rod end (1).


B
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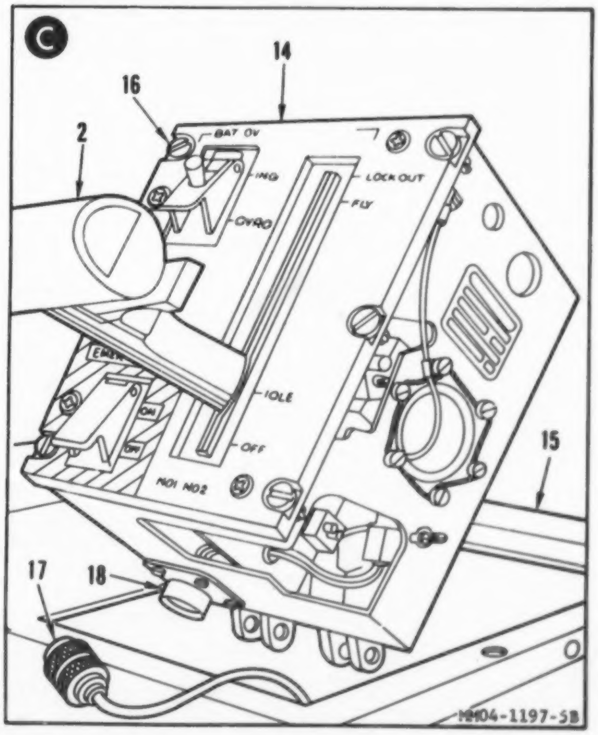
MM04-1197-4A

6. **Disconnect rod end (7) from No. 1 power lever (8).**
   a. Remove and discard cotter pin (9).
   b. Hold bolt (10).
   c. Remove nut (11) and washer (12).
   d. Remove bolt (10) and washer (13) from power lever (8) and rod end (7).


C
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16
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BAT OV
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GYRO
LOCK OUT
FLY
IDLE
OFF
EMER
ON
NO1 NO2
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17
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MM04-1197-5B

7. **Remove quadrant assembly (14) from console (15).**
   a. Unlock six Camloc fasteners (16).
   b. Lift quadrant (14) from console (15).
8. **Detach connector P190 (17) from connector J1 (18).**

B. **CLEANING**

Wipe all removed and attaching parts with clean rag.

C. **INSPECTION**

1. **Check power quadrant for cracks.** None allowed.
2. **Check connectors P190 and J1 for damage** (TM 55-1500-323-24).

END OF TASK

4-8-23. CPG POWER QUADRANT INSTALLATION 4-8-23

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Materials/Parts:

Cotter Pin (2)

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

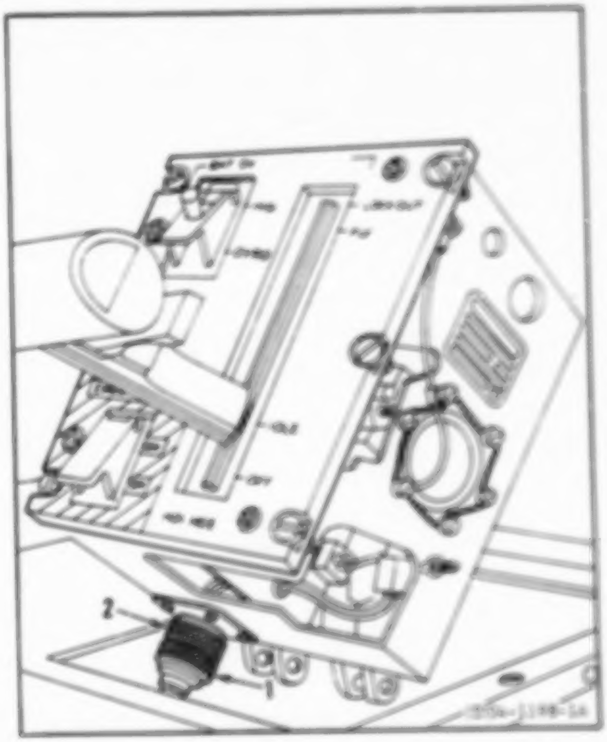
References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

1. Enter CPG station (para 1-7-1). Observe all safety precautions.
2. Attach connector P190 (1) to power quadrant connector J1 (2).



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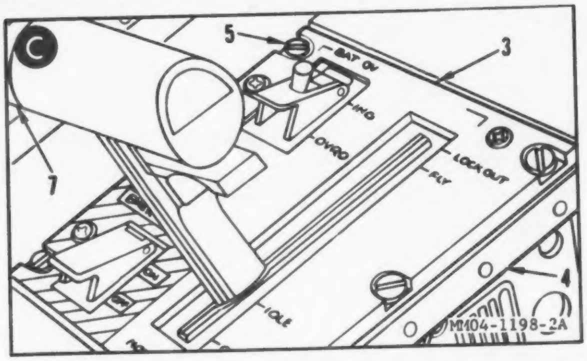
4-8-23. CPG POWER QUADRANT INSTALLATION (cont)

3. Install quadrant assembly (3) in console (4). Lock six Camloc fasteners (5).


C
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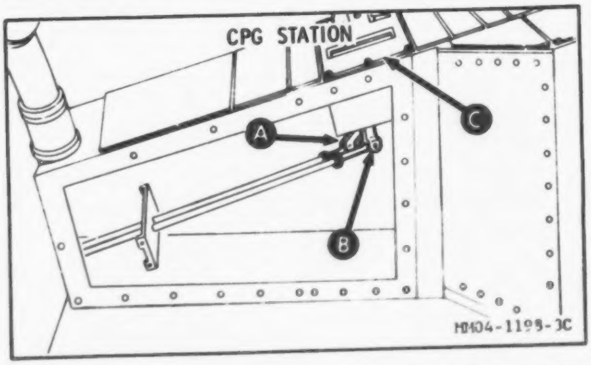
LOCK OUT
FLY
7
4
IDLE
MM04-1198-2A

4. Connect rod end (6) to No. 1 lever (7).

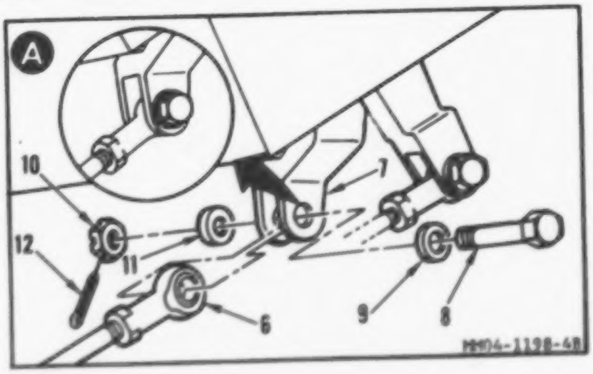

CPG STATION
A
C
B
MM04-1198-3C

   a. Position No. 1 power lever (7) in IDLE position.

   b. Install bolt (8) through washer (9), power lever (7), and rod end (6).

   c. Hold bolt (8).

   d. Install washer (11) and nut (10) on bolt (8).


A
10
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12
11
6
9
8
MM04-1198-4B

5. Torque nut (10) 50 to 70 INCH-POUNDS

   a. Hold bolt (8). Torque nut (10) to 50 INCH-POUNDS.

   b. Increase torque to aline cotter pin hole, but do not exceed 70 INCH-POUNDS.

   c. Install new cotter pin (12).

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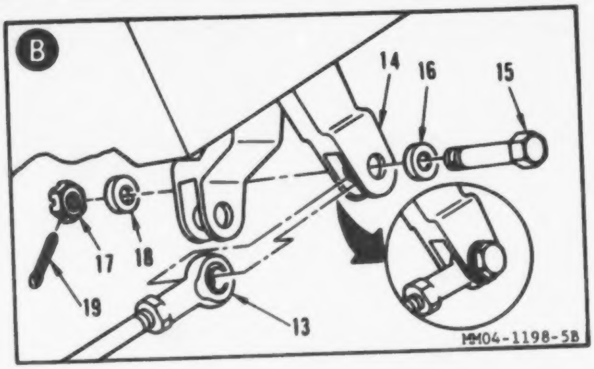
4-8-23. CPG POWER QUADRANT INSTALLATION (cont)



6. **Connect rod end (13) to No. 2 power lever (14).**

   a. Install bolt (15) through washer (16), power lever (14), and rod end (13).

   b. Hold bolt (15).

   c. Install washer (18) and nut (17) and on bolt (15).

7. **Torque nut (17) to 50 to 70 INCH-POUNDS.**

   a. Hold bolt (15) and torque nut (17) to **50 INCH-POUNDS.**

   b. Increase torque to aline cotter pin hole, but do not exceed **70 INCH-POUNDS.**

   c. Install new cotter pin (19).

8. **Inspect (TI).**

9. **Perform power plant operational check (engine 1 and engine 2)** (TM 55-1520-238-T).

10. **Install panels CL1 and CL3** (para 2-2-2).

END OF TASK

4-8-24. NO. 1 ENGINE POWER AVAILABLE SPINDLE AFT CABLE REMOVAL 4-8-24

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Aviation Ground Power Unit (AGPU)	1730-01-144-1897

Personnel Required:

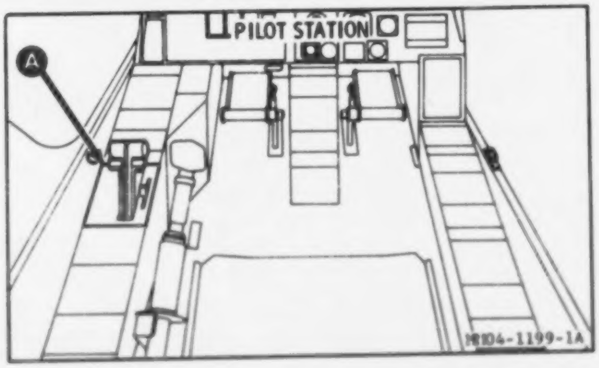
67R10 Attack Helicopter Repairer

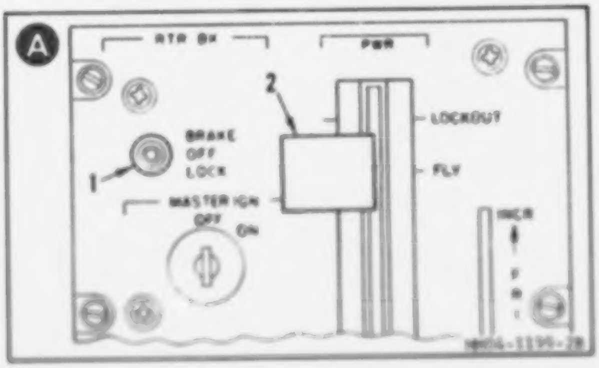
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access panel L200 removed; access door LN1 opened

A. REMOVAL

1. Connect AGPU (para 1-7-16).
2. Enter pilot station (para 1-7-1). Observe all safety precautions.
3. Set RTR BK switch (1) to OFF.
4. Set pilot No. 1 PWR lever (2) to FLY.
5. Disconnect AGPU (para 1-7-16).


PILOT STATION
A
M104-1199-1A


A
RTR BK
PWR
2
LOCKOUT
BRAKE
OFF
LOCK
1
FLY
MASTER IGN
OFF
ON
INCR
M104-1199-2A

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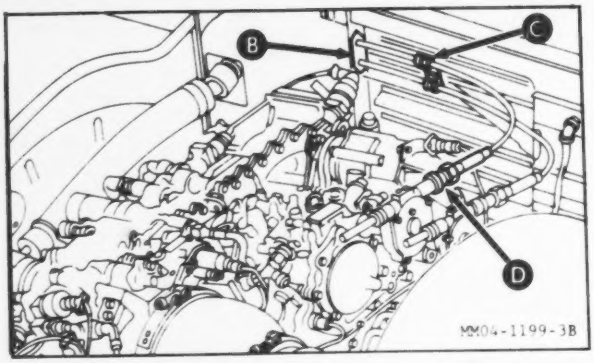
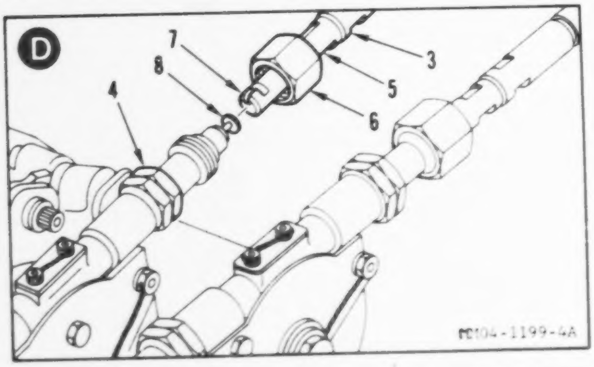
4-8-24. NO. 1 ENGINE POWER AVAILABLE SPINDLE AFT CABLE REMOVAL (cont) 4-8-24


B
C
D
MM04-1199-3B

6. **Disconnect aft cable (3) from gearbox (4).**
   - a. Hold cable (3) flats (5).
   - b. Remove coupling nut (6).
   - c. Disconnect cable fitting (7) from gearbox fitting (8).


D
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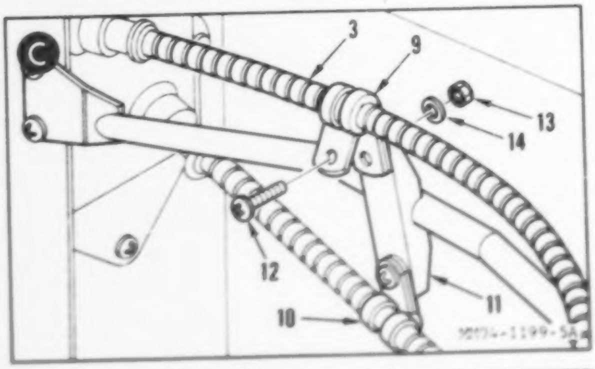
6
MM04-1199-4A

7. **Remove clamps (9) and (10) from support (11).**
   - a. Hold two screws (12).
   - b. Remove two nuts (13) and washers (14).
   - c. Remove two screws (12).
   - d. Remove top clamp (9) from cable (3).


C
3
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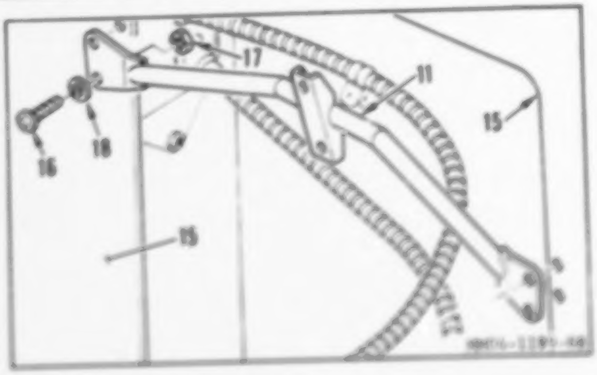
MM04-1199-5A

8. **Remove support (11) from firewall (15).**
   - a. Hold four screws (16).
   - b. Remove four nuts (17).
   - c. Remove four screws (16) and washers (18).


17
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15

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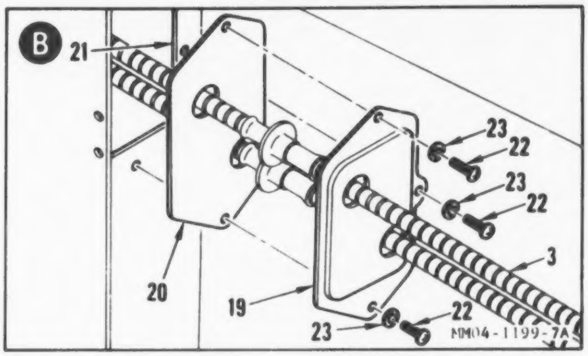
4-8-24. NO. 1 ENGINE POWER AVAILABLE SPINDLE AFT CABLE REMOVAL (cont) 4-8-24

9. **Remove fireseals (19) and (20) from louver enclosure (21).**
   a. Remove three screws (22) and washers (23).
   b. Slide fireseals (19) and (20) aft onto cable (3).


B
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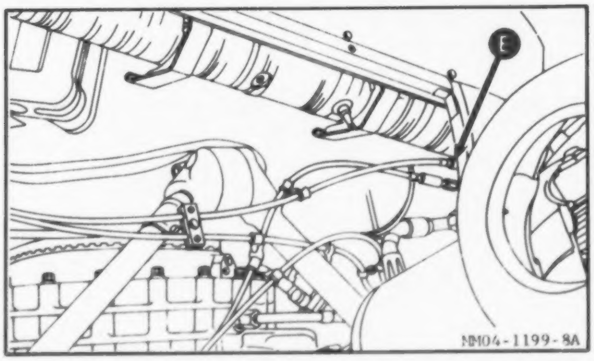
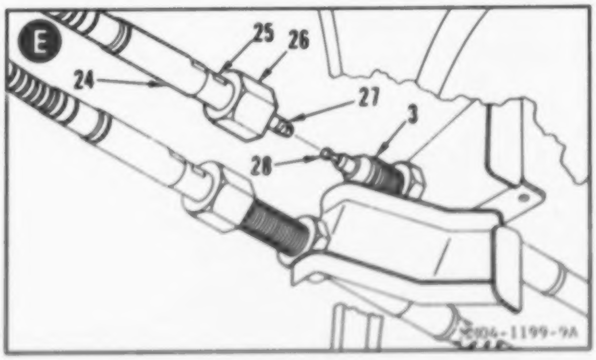
NM04-1199-7A


E
NM04-1199-8A

10. **Disconnect forward cable (24) from aft cable (3).**
    a. Hold cable flats (25).
    b. Remove coupling nut (26).
    c. Disconnect cable fitting (27) from aft cable fitting (28).


E
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26
24
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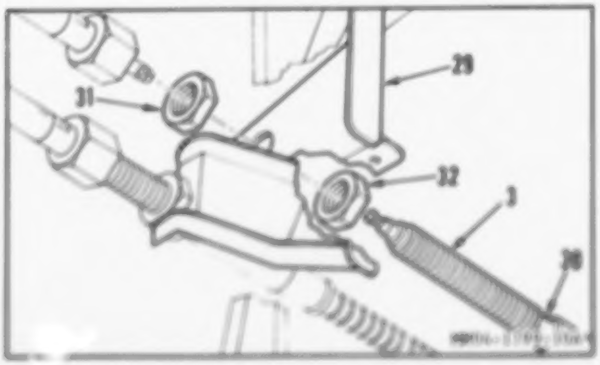
NM04-1199-9A

11. **Remove cable (3) from support (29).**
    a. Hold cable flats (30).
    b. Remove nut (31).
    c. Pull cable (3) out of bracket (29).
    d. Remove nut (32) from cable (3).



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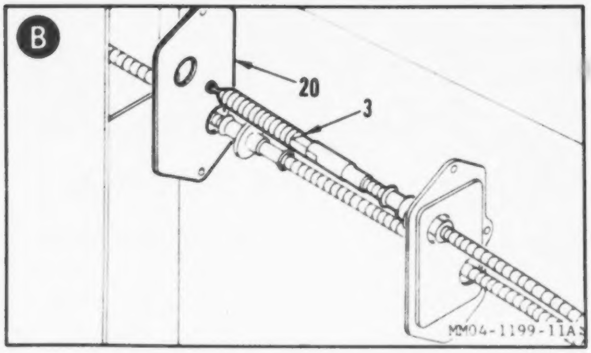
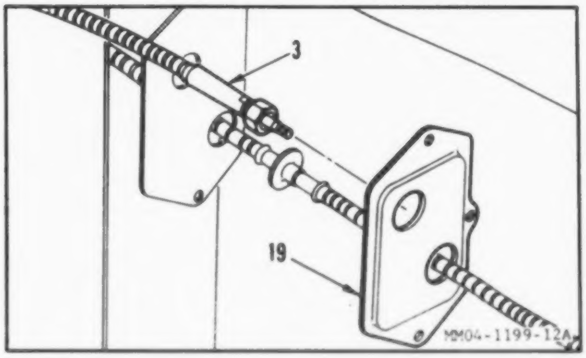
4-8-24. NO. 1 ENGINE POWER AVAILABLE SPINDLE AFT CABLE REMOVAL (cont) 4-8-24

12. Pull cable (3) aft from fireseal (20).



13. Pull cable (3) forward from fireseal (19).



B. CLEANING

Wipe supports and fireseals with a clean rag.

C. INSPECTION

1. Check supports and fireseals for cracks and bending.
   None allowed.

2. Check supports and fireseals for corrosion (para 1-5-38).

END OF TASK

4-8-25. NO. 1 ENGINE POWER AVAILABLE SPINDLE AFT CABLE INSTALLATION 4-8-25

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Scale, Dial Indicating	6670-00-240-5821
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Wrench, Torque, 1/4 Drive	5120-00-117-4832

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

GO TO NEXT PAGE

4-8-25. NO. 1 ENGINE POWER AVAILABLE SPINDLE AFT CABLE INSTALLATION (cont) 4-8-25

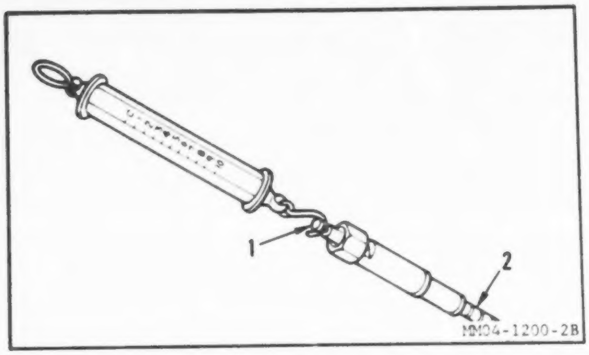
1. **Check cable ribbon (1) friction load.**

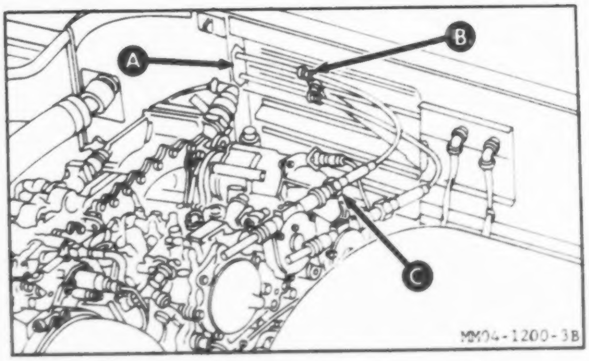
   a. Place cable (2) on flat surface. Be sure cable (2) is not bent or twisted.

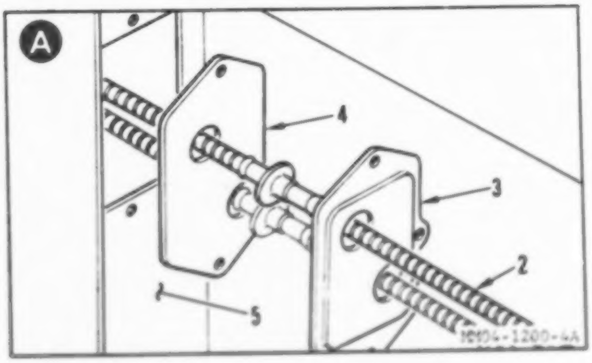
   b. Slide ribbon (1) 2-1/2 inches in and out of cable (2). There should be no binding, stiffness, or jamming.

   c. Check friction load of ribbon (1). Load not to exceed **1-1/2 pounds.** Use dial-indicating scale

   d. If ribbon movement is rough, or friction load exceeds **1-1/2 pounds,** replace cable.







2. **Install aft cable (2) through fireseals (3) and (4) and louver enclosure (5).**

   a. Insert coupling nut end of cable (2) aft through fireseal (3).

   b. Pull cable (2) through fireseal (3).

   c. Insert threaded end of cable (2) forward through fireseal (4) and louver enclosure (5).

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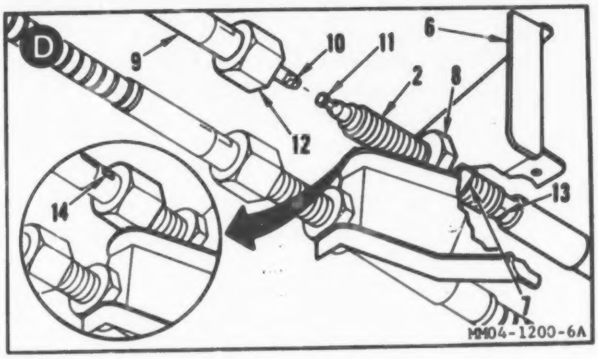
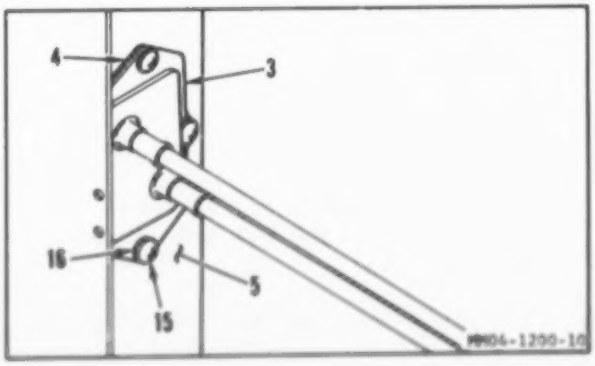
4-8-25. NO. 1 ENGINE POWER AVAILABLE SPINDLE AFT CABLE INSTALLATION (cont) 4-8-25



3. **Install aft cable (2) on support (6).**
   - a. Center nut (7) on threaded area of cable (2).
   - b. Insert cable (2) through support (6).
   - c. Install nut (8) three turns on cable (2).
4. **Connect forward cable (9) to aft cable (2).**
   - a. Connect cable (2) with cable (9) by adjusting nuts (7) and (8).
   - b. Connect cable fitting (10) to cable fitting (11).
   - c. Install coupling nut (12).
5. **Torque nuts (7) and (8) to 25 INCH-POUNDS.** Hold cable flats (13). Use 1/4 drive torque wrench. (0-30 inch-pounds).
6. **Torque coupling nut (12) to 70 INCH-POUNDS.** Hold cable flats (14). Use 1/4 drive torque wrench. (30-150 inch-pounds).
7. **Install fireseals (3) and (4) on louver enclosure (5).** Install three washers (16) and screws (15).



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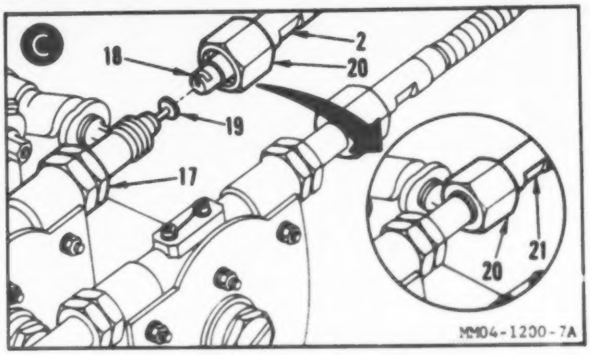
4-8-25. NO. 1 ENGINE POWER AVAILABLE SPINDLE AFT CABLE INSTALLATION (cont) 4-8-25

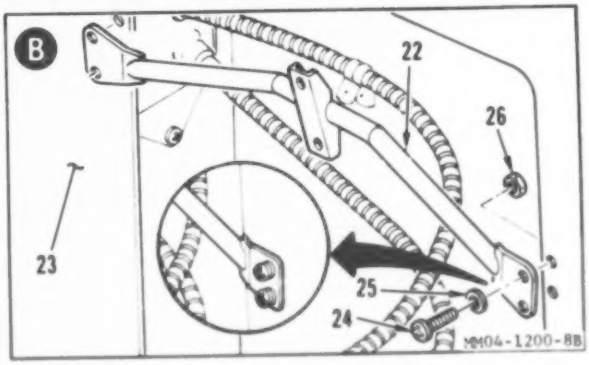


8. Connect aft cable (2) to gearbox (17).

a. Connect cable fitting (18) to gearbox fitting (19).

b. Install coupling nut (20).

9. Torque coupling nut (20) to 70 INCH-POUNDS. Hold cable flats (21). (30-150 inch-pounds).



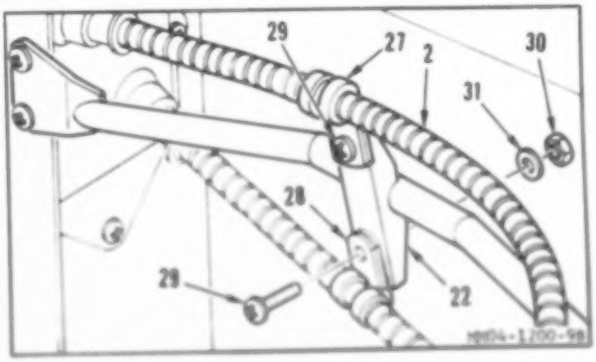
10. Install support (22) on firewall (23).

a. Put support (22) in place on firewall (23).

b. Install four screws (24) through four washers (25) and support (22) into firewall (23).

c. Hold four screws (24).

d. Install four nuts (26).



11. Install clamps (27) and (28) on support (22).

a. Position clamp (27) in place on cable (2).

b. Install two screws (29) through clamps (27) and (28) and support (22).

c. Hold two screws (29). Install two washers (31) and nuts (30).

12. Inspect (TI).

13. Perform No. 1 engine power available spindle rigging check (para 4-8-35).

14. Perform power plant operational check (engine 1) (TM 55-1520-238-T).

15. Secure access door LN1 and access panel L200 (para 2-2-2).

END OF TASK

4-8-26. NO. 2 ENGINE POWER AVAILABLE SPINDLE AFT CABLE REMOVAL 4-8-26

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

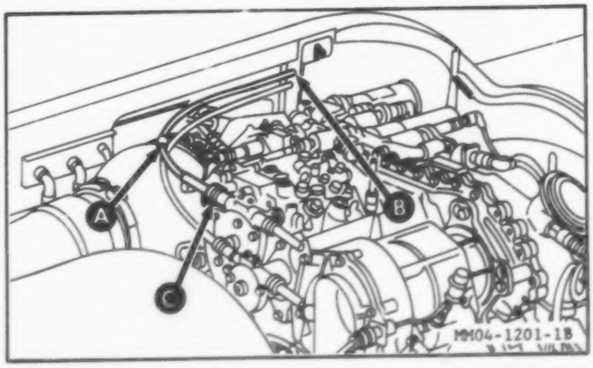
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

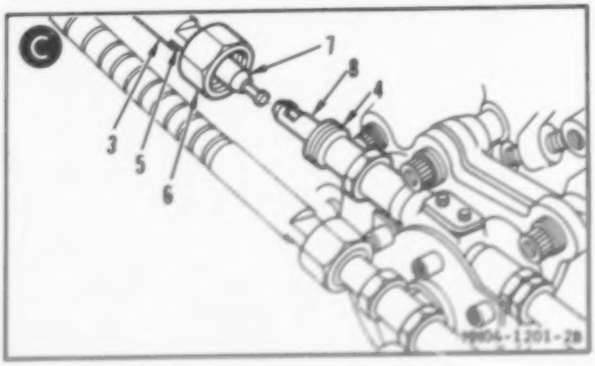
Personnel Required:

67R10 Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access panel R200 removed; access door RN1 opened.





A. REMOVAL

1. Disconnect aft cable (1) from gearbox (2).

   a. Hold cable flats (3).

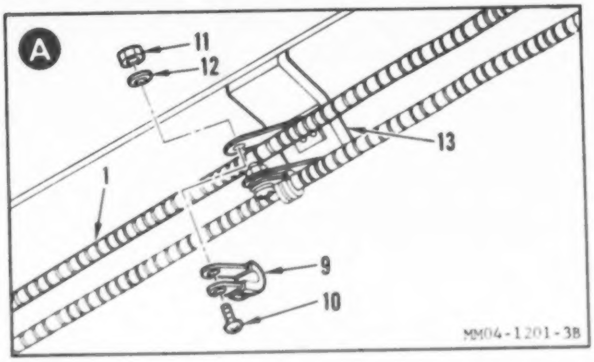
   b. Remove coupling nut (4.

   c. Disconnect cable fittig (5) from gearbox fitting ().

GO TO NEXT PAGE

4-8-26. NO. 2 ENGINE POWER AVAILABLE SPINDLE AFT CABLE REMOVAL (cont) 4-8-26

2. **Remove clamp (7) from cable (1).**
   a. Hold screw (8).
   b. Remove nut (9) and washer (10).
   c. Remove screw (8).
   d. Remove clamp (7) from cable (1) and bracket (11).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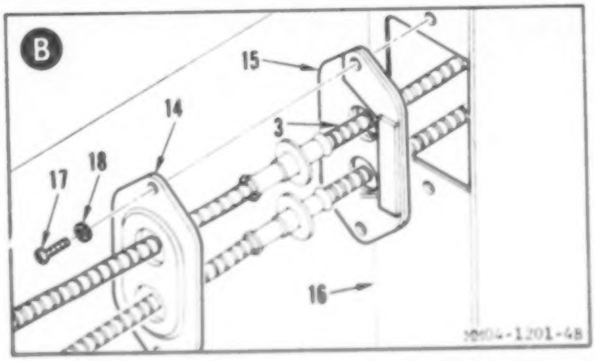
MM04-1201-3B

3. **Remove fireseals (12) and (13) from louver enclosure (14).**
   a. Remove two screws (15) and washers (16).
   b. Slide fireseals (12) and (13) aft onto cable (1).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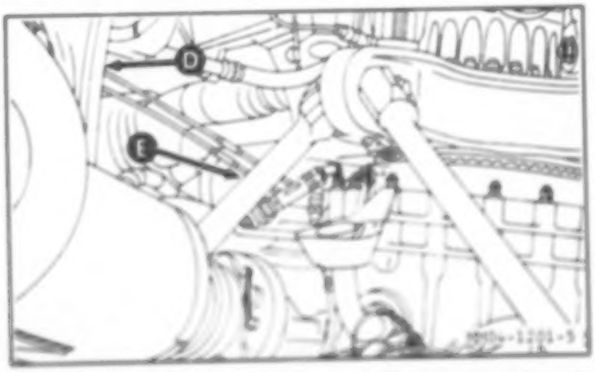
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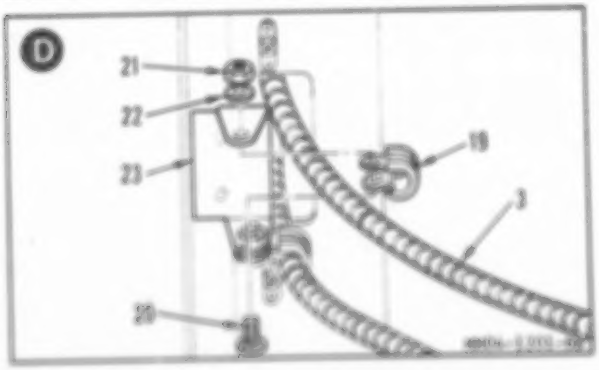
MM04-1201-5

4. **Remove clamp (17) from cable (1).**
   a. Hold screw (18).
   b. Remove nut (19) and washer (20).
   c. Remove screw (18).
   d. Remove clamp (17) from cable (1) and support (21).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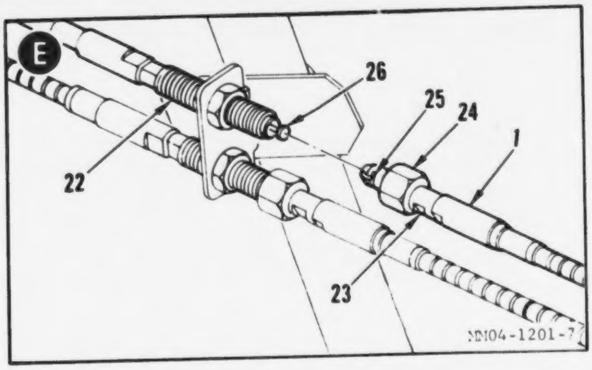
4-8-26. NO. 2 ENGINE POWER AVAILABLE SPINDLE AFT CABLE REMOVAL (cont) 4-8-26

5. **Disconnect aft cable (1) from forward cable (22).**
   a. Hold cable flats (23).
   b. Remove coupling nut (24).
   c. Disconnect cable fitting (25) from cable fitting (26).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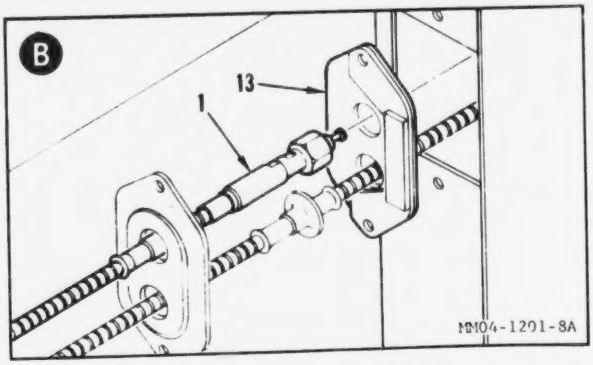
MM04-1201-7

6. **Pull cable (1) aft from fireseal (13).**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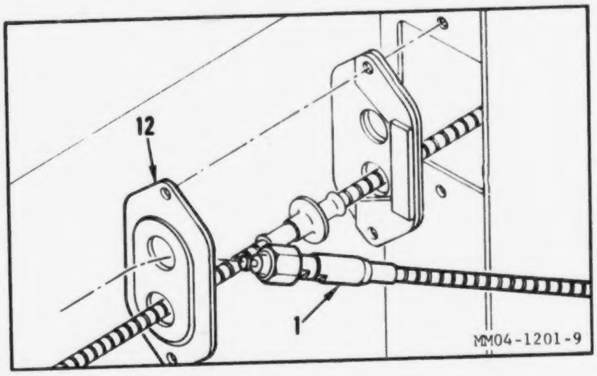
MM04-1201-8A

7. **Pull cable (1) forward from fireseal (12).**


12
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MM04-1201-9

B. CLEANING

Clean bracket, support, and fireseals (para 1-5-36).

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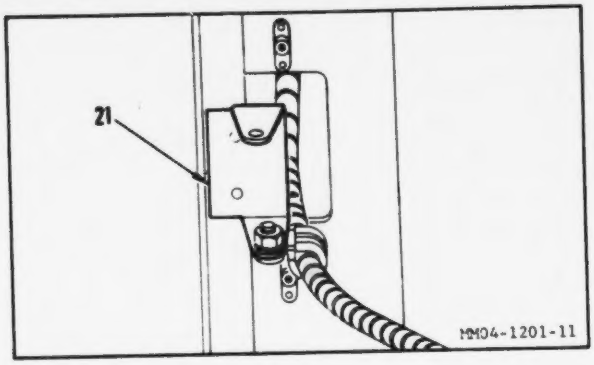
4-8-26. NO. 2 ENGINE POWER AVAILABLE SPINDLE AFT CABLE REMOVAL (cont) 4-8-26

C. INSPECTION

1. Check bracket, support, and fireseals for cracks and bending. None allowed.

2. Check bracket, support, and fireseals for corrosion (para 1-5-38).



END OF TASK

4-8-27. NO. 2 ENGINE POWER AVAILABLE SPINDLE AFT CABLE INSTALLATION (cont) 4-8-27

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Scale, Dial Indicating	6670-00-240-5821

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

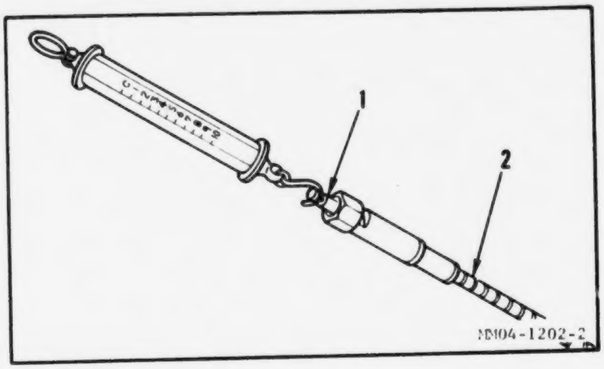
1. **Check cable ribbon (1) friction load.**

   a. Place cable (2) on flat surface. Be sure cable (2) is not bent or twisted.

   b. Slide ribbon (1) 2-1/2 inches in and out of cable (2). There should be no binding, stiffness, or jamming.

   c. Check friction load of ribbon (1). Load not to exceed **1-1/2 pounds**. Use dial-indicating scale.

   d. If ribbon movement is rough, or friction load exceeds **1-1/2 pounds**, replace cable.



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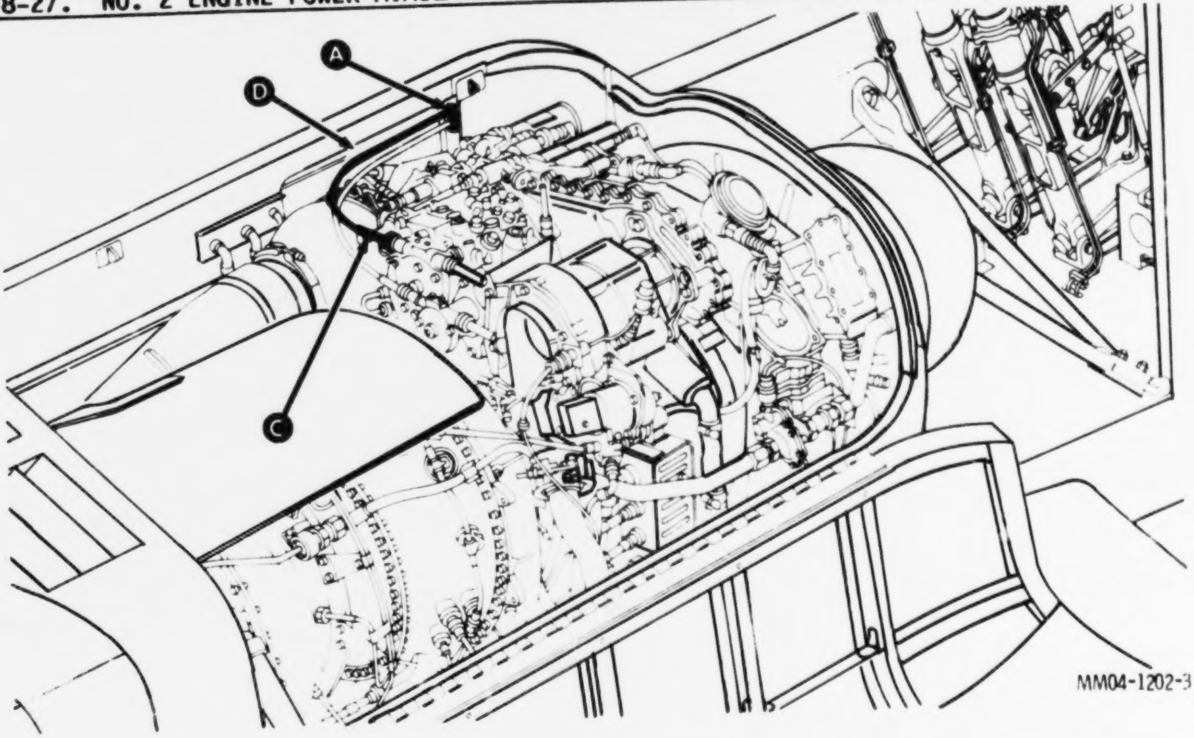
4-8-27. NO. 2 ENGINE POWER AVAILABLE SPINDLE AFT CABLE INSTALLATION (cont) 4-8-27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2. **Install cable (2) through fireseals (3) and (4).**

   a. Insert nut end of cable (2) forward through fireseal (3).

   b. Insert opposite end of cable (2) aft through fireseal (4).

3. **Install fireseals (3) and (4) on louver enclosure (5).**

   a. Position fireseals (3) and (4) in place on firewall (5).

   b. Install three washers (7) and screws (6).

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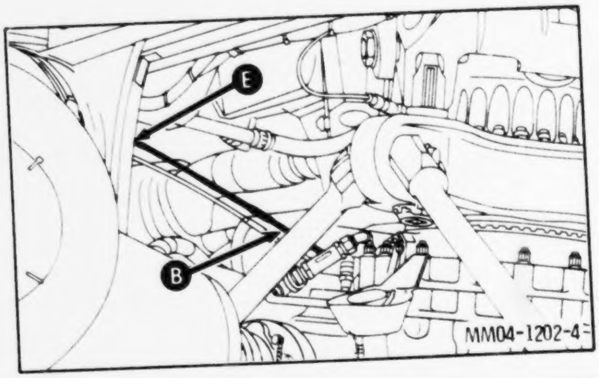
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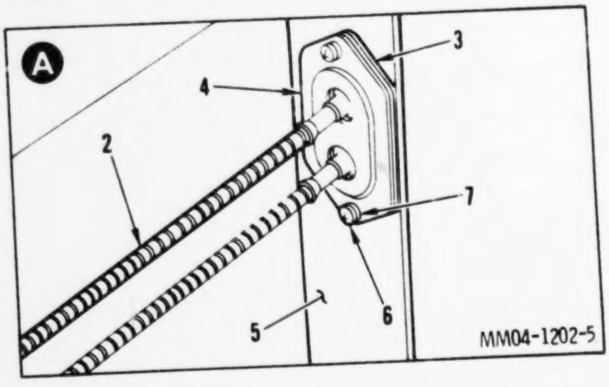
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MM04-1202-5

4-8-27. NO. 2 ENGINE POWER AVAILABLE SPINDLE AFT CABLE INSTALLATION (cont) 4-8-27

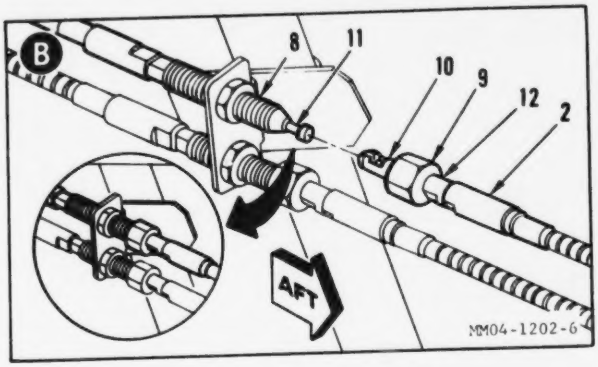
4. **Connect aft cable (2) to forward cable (8).** Torque nut (9) to **70 INCH-POUNDS.**

   a. Connect cable fitting (10) to cable fitting (11).

   b. Install nut (9) on cable (8).

   c. Hold cable (2) at wrench flats (12).

   d. Torque nut (9) to **70 INCH-POUNDS.**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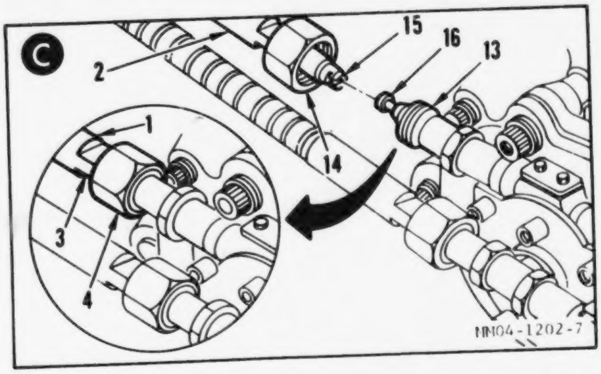
MM04-1202-6

5. **Connect aft cable (2) to gearbox (13).** Torque nut (14) to **70 INCH-POUNDS.**

   a. Connect cable fitting (15) to gearbox fitting (16) and install nut (14).

   b. Torque nut (14) to **70 INCH-POUNDS.**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MM04-1202-7

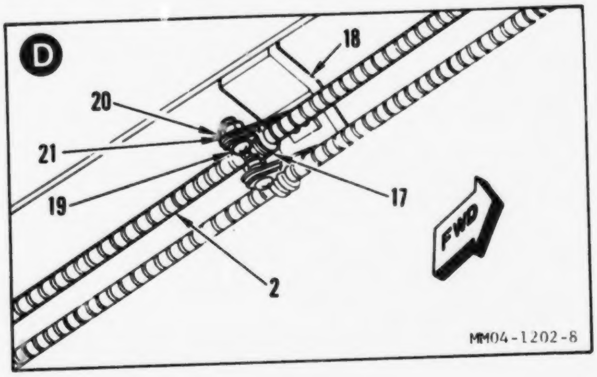
6. **Install clamp (17) on bracket (18).**

   a. Position clamp (17) in place on cable (2).

   b. Install screw (19) through clamp (17) and bracket (18).

   c. Hold screw (19).

   d. Install washer (21) and nut (20) on screw (19).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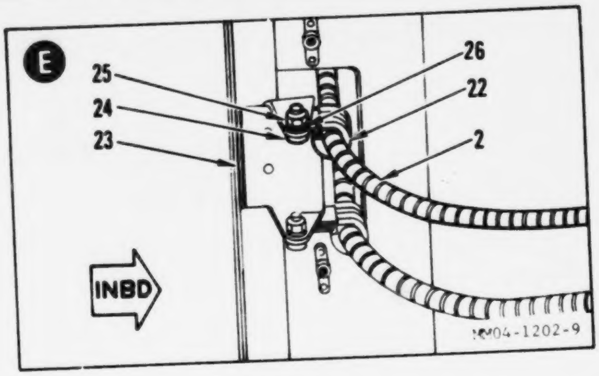
4-8-27. NO. 2 ENGINE POWER AVAILABLE SPINDLE AFT CABLE INSTALLATION (cont) 4-8-27



7. **Install clamp (22) on bracket (23).**
   a. Position clamp (22) in place on cable (2).
   b. Install screw (24) through clamp (22) and bracket (23).
   c. Hold screw (24).
   d. Install washer (26) and nut (25).
8. **Perform rigging check** (para 4-8-37).
9. **Inspect** (TI).
10. **Perform power plant operational check (engine 2)** (TM 55-1520-238-T).
11. **Secure access door RN1 and access panel R200** (para 2-2-2).

END OF TASK

4-8-28. NO. 1 ENGINE LOAD DEMAND SPINDLE AFT CABLE REMOVAL 4-8-28

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Aviation Ground Power Unit (AGPU)	1730-01-144-1897

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access door LN1 opened; access panel L200 removed.

Personnel Required:

67R10 Attack Helicopter Repairer

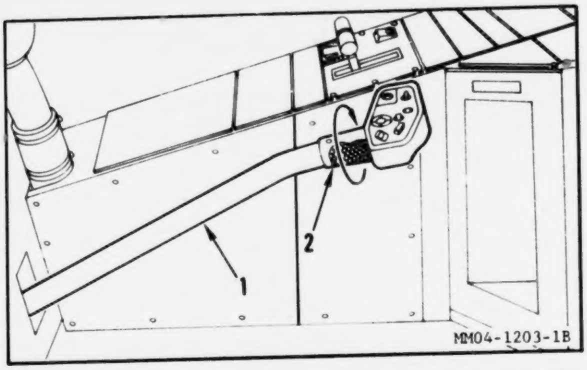
A. **REMOVAL**

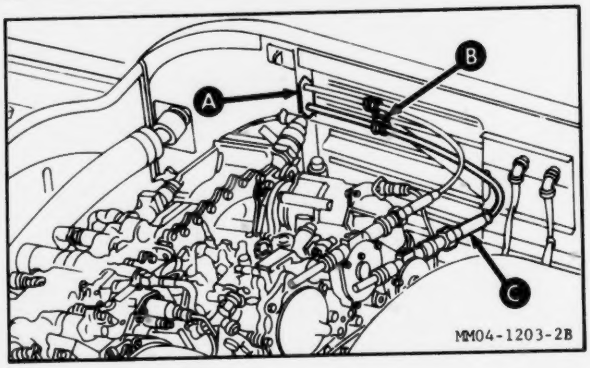
1. **Connect AGPU** (para 1-7-16 and 1-7-18).

2. **Enter pilot station** (para 1-7-1). **Observe all safety precautions.**

3. **Set collective stick (1) to full up.** Rotate friction lock (2) counterclockwise to lock.

4. **Disconnect AGPU** (para 1-7-16 and 1-7-18).





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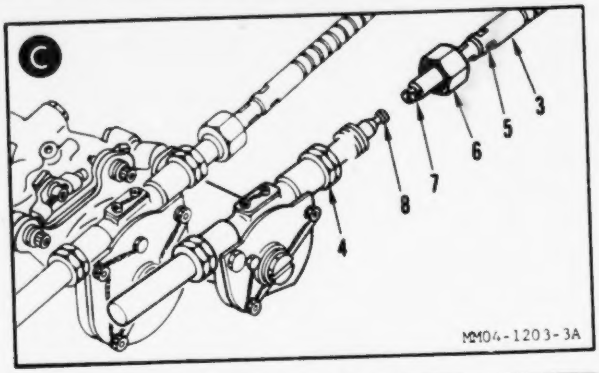
4-8-28. NO. 1 ENGINE LOAD DEMAND SPINDLE AFT CABLE REMOVAL (cont) 4-8-28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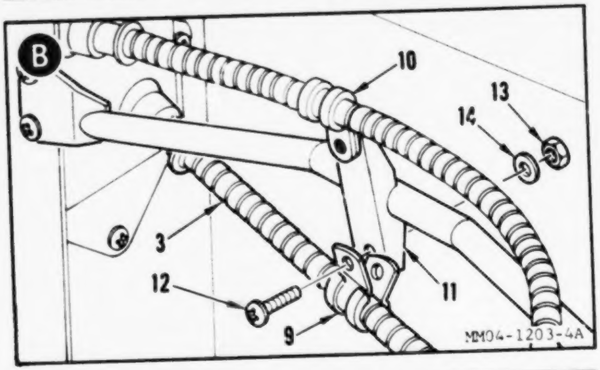
MM04-1203-3A

5. **Disconnect aft cable (3) from gearbox (4).**

   a. Hold cable flats (5).

   b. Remove coupling nut (6).

   c. Disconnect cable fitting (7) from gearbox fitting (8).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MM04-1203-4A

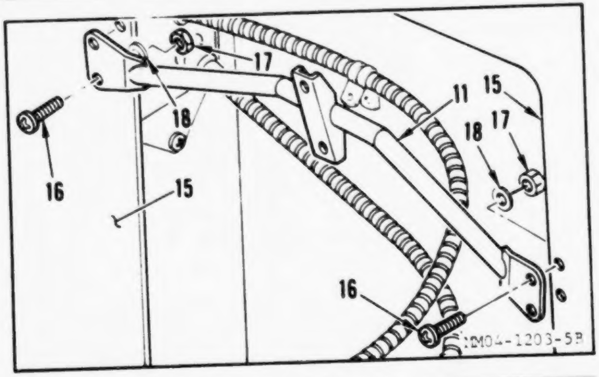
6. **Remove clamps (9) and (10) from support (11).**

   a. Hold two screws (12).

   b. Remove two nuts (13) and two washers (14).

   c. Remove two screws (12).

   d. Remove clamp (9) from cable (3).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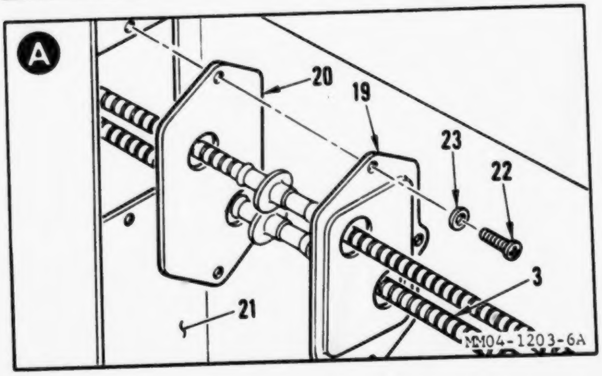
MM04-1203-5B

7. **Remove support (11) from firewall (15).**

   a. Hold four screws (16).

   b. Remove four nuts (17).

   c. Remove four screws (16) and washers (18).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MM04-1203-6A

8. **Remove fireseals (19) and (20) from louver enclosure (21).**

   a. Remove three screws (22) and washers (23).

   b. Slide fireseals (19) and (20) aft onto cable (3).

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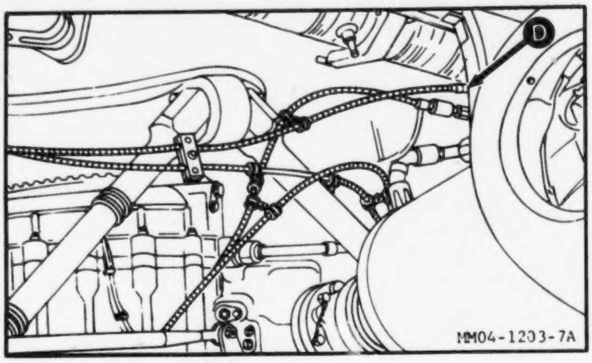
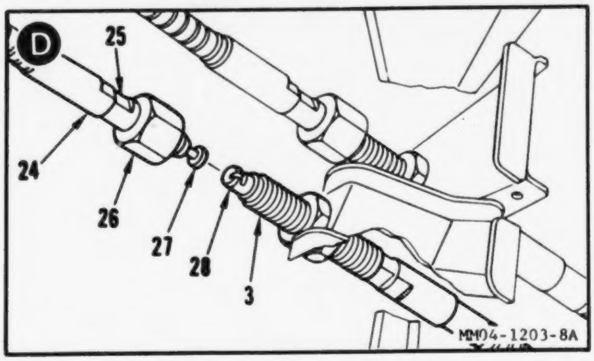
4-8-28. NO. 1 ENGINE LOAD DEMAND SPINDLE AFT CABLE REMOVAL (cont) 4-8-28


D
MM04-1203-7A

9. **Disconnect forward cable (24) from aft cable (3).**
   - a. Hold cable flats (25).
   - b. Remove coupling nut (26).
   - c. Disconnect cable fitting (27) from cable fitting (28).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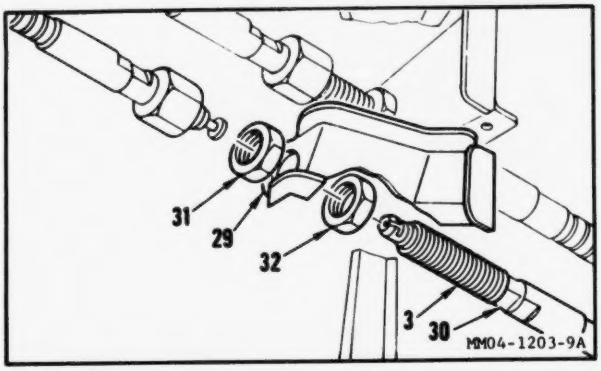
MM04-1203-8A

10. **Remove aft cable (3) from support (29).**
    - a. Hold cable flats (30).
    - b. Remove nut (31).
    - c. Remove cable (3) from bracket (29).
    - d. Remove nut (32) from cable (3).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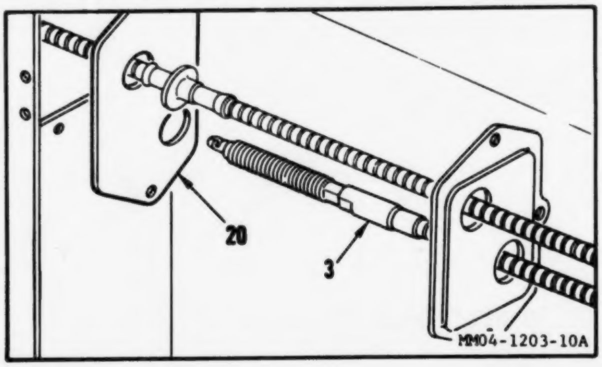
MM04-1203-9A

11. **Pull cable (3) aft from fireseal (20).**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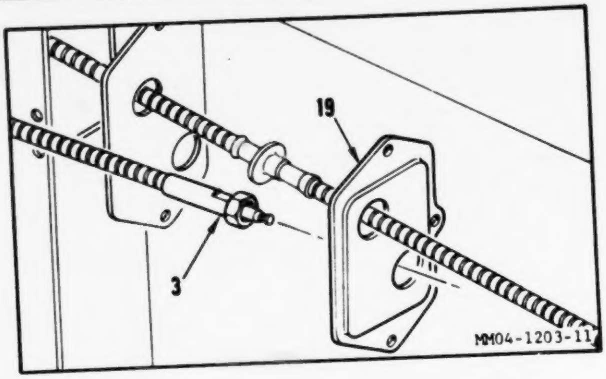
4-8-28. NO. 1 ENGINE LOAD DEMAND SPINDLE AFT CABLE REMOVAL (cont)



12. Pull cable (3) forward from fireseal (19).

B. CLEANING

Wipe supports and fireseals with a clean rag.

C. INSPECTION

1. Check supports and fireseals for cracks and bending. None allowed.

2. Check supports and fireseals for corrosion (para 1-5-38).

END OF TASK

4-8-29. NO. 1 ENGINE LOAD DEMAND SPINDLE AFT CABLE INSTALLATION 4-8-29

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Scale, Dial Indicating	6670-00-240-5821

References:

TM 55-1520-238-T

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

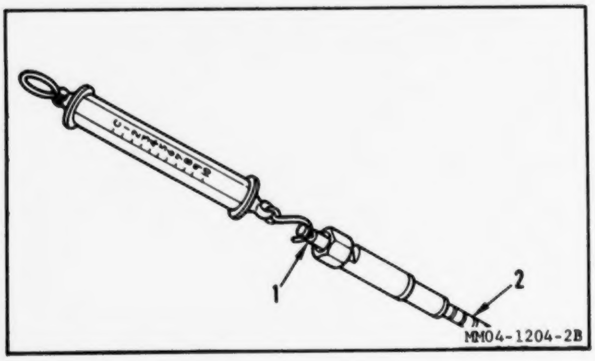
1. **Check cable ribbon (1) for friction load.**

   a. Place cable (2) on flat surface. Be sure cable (2) is not bent or twisted.

   b. Slide ribbon (1) 2-1/2 inches in and out of cable (2). There should be no binding, stiffness, or jamming.

   c. Check friction load of ribbon (1). Load not to exceed 1-1/2 pounds. Use dial-indicating scale.

   d. If ribbon movement is rough, or friction load exceeds **1-1/2 pounds,** do not install cable.



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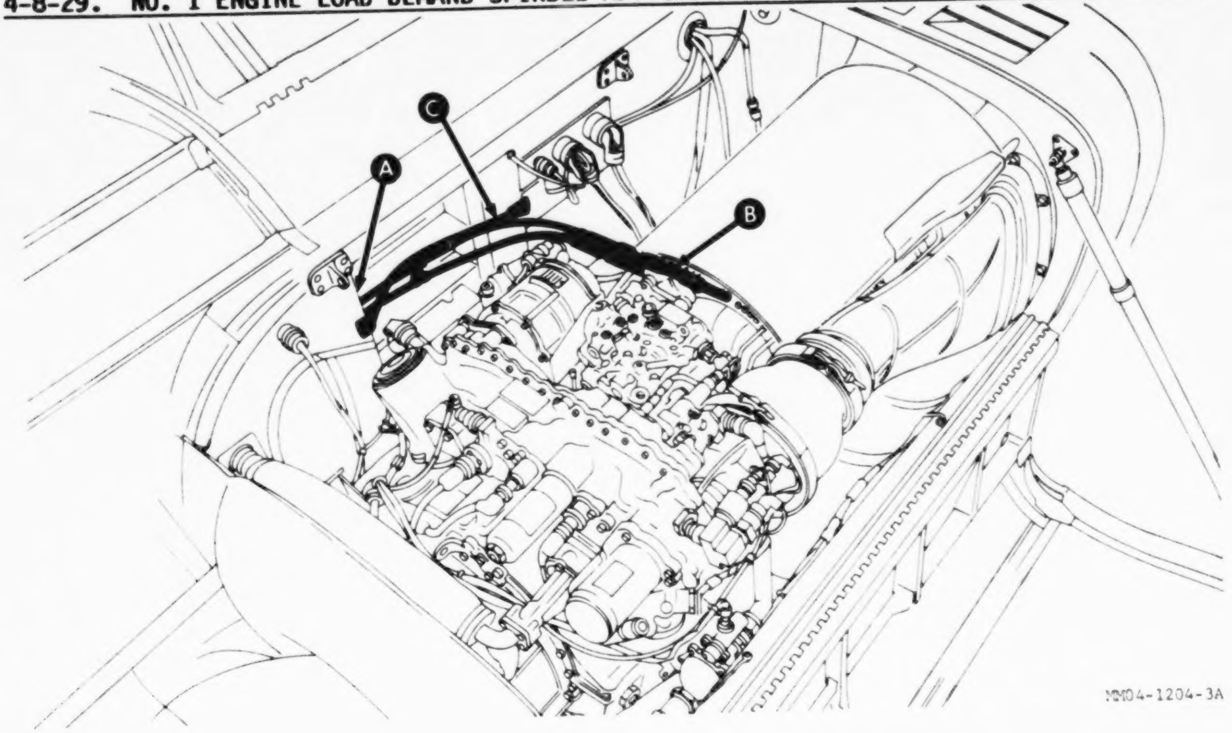
4-8-29. NO. 1 ENGINE LOAD DEMAND SPINDLE AFT CABLE INSTALLATION (cont) 4-8-29



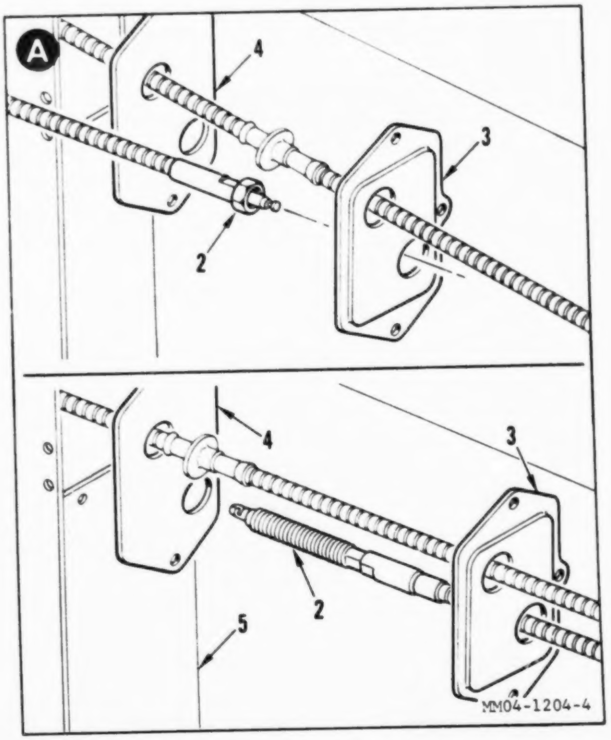
MM04-1204-3A

2. Route cable (2) through aft fireseal (3) and forward fireseal (4).

   a. Insert coupling nut end of cable (2) aft through aft fireseal (3).

   b. Pull cable (2) aft through aft fireseal (3).

   c. Insert threaded end of cable (2) through forward fireseal (4) and louver enclosure (5).



MM04-1204-4

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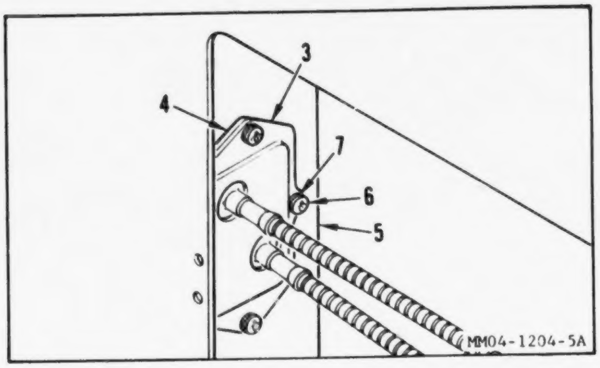
4-8-29. NO. 1 ENGINE LOAD DEMAND SPINDLE AFT CABLE INSTALLATION (cont) 4-8-29

3. **Install fireseals (3) and (4) on louver enclosure (5).** Install three screws (6) with washers (7).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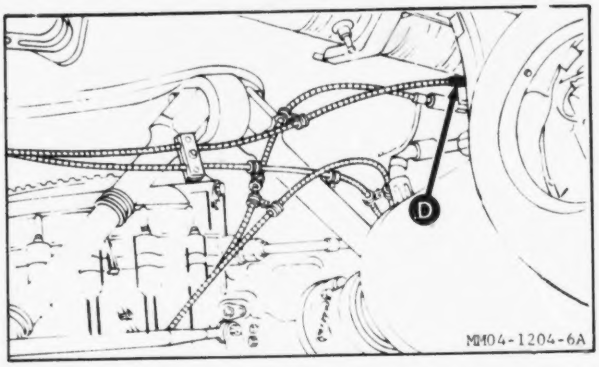
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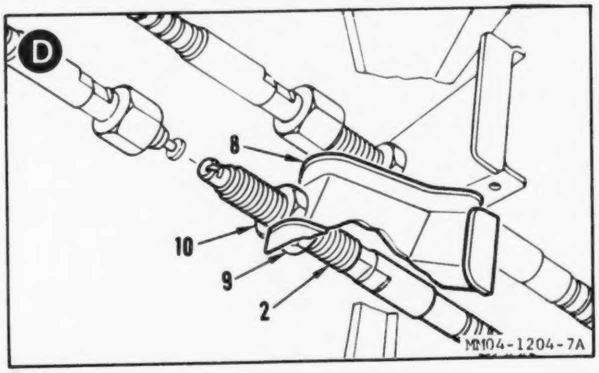
MM04-1204-6A

4. **Install cable (2) on bracket (8).**
   - a. Install nut (9) on threaded end of cable (2) one-half of threaded length.
   - b. Insert threaded end of cable (2) through bracket (8).
   - c. Install nut (10) on threaded end of cable (2).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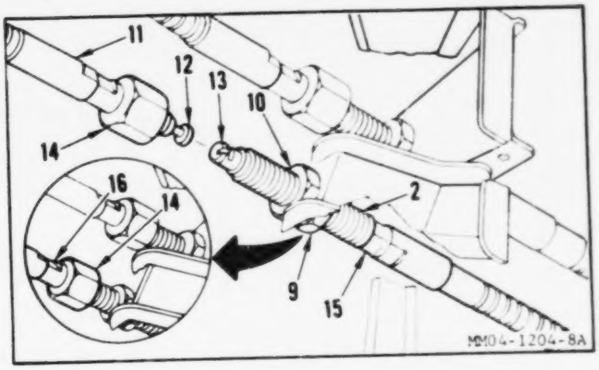
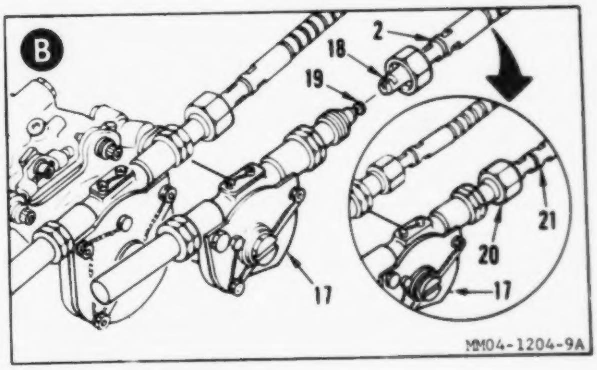
4-8-29. NO. 1 ENGINE LOAD DEMAND SPINDLE AFT CABLE INSTALLATION (cont) 4-8-29



5. **Connect forward cable (11) to aft cable (2).**
   - a. Adjust nuts (9) and (10) to aline cable (2) to cable (11).
   - b. Connect cable (11) fitting (12) to cable (2) fitting connector (13).
   - c. Install coupling nut (14) on cable (2).
6. **Torque nut (9) and (10) to 90 INCH-POUNDS.**
   - a. Hold cable flats (15).
   - b. Torque nuts (9) and (10) to **90 INCH-POUNDS.**
7. **Torque coupling nut (14) to 70 INCH-POUNDS.**
   - a. Hold cable flats (16).
   - b. Torque nut (14) to **70 INCH-POUNDS.**
8. **Connect aft cable (2) to gearbox (17).**
   - a. Connect cable fitting (18) to gearbox fitting (19).
   - b. Install coupling nut (20) on gearbox (17).
9. **Torque coupling nut (20) to 70 INCH-POUNDS.** Hold cable flats (21). Torque nut (20) to **70 INCH-POUNDS.**



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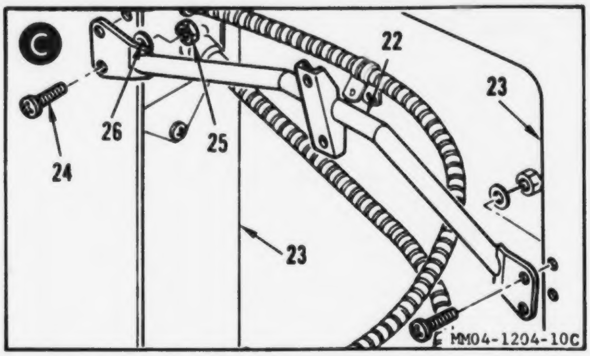
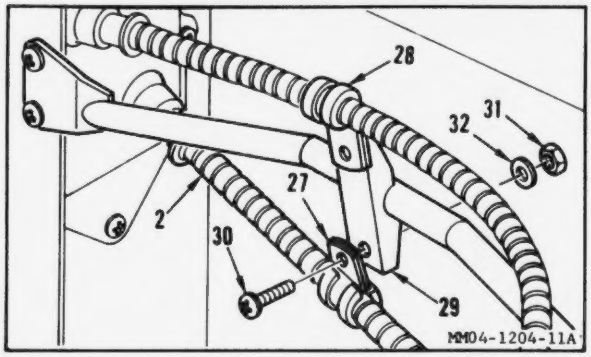
4-8-29. NO. 1 ENGINE LOAD DEMAND SPINDLE AFT CABLE INSTALLATION (cont) 4-8-29



10. **Install support (22) on firewall (23).**
    a. Install four screws (24) through support (22) and firewall (23).
    b. Hold four screws (24).
    c. Install four nuts (25) with four washers (26).



11. **Install clamps (27) and (28) on bracket (29).**
    a. Position clamp (27) in place on cable (2).
    b. Insert two screws (30) through clamps (27) and (28) and bracket (29).
    c. Hold two screws (30).
    d. Install two washers (32) and two nuts (31).
12. **Inspect (TI).**
13. **Perform No. 1 and No. 2 engine load demand spindle rigging check** (para 4-8-34).
14. **Perform power plant operational check (engine 1)** (TM 55-1520-238-T).
15. **Secure access panel L200** (para 2-2-2).
16. **Secure access door LN1** (para 2-2-2).

END OF TASK

4-8-30. NO. 2 ENGINE LOAD DEMAND SPINDLE AFT CABLE REMOVAL 4-8-30

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

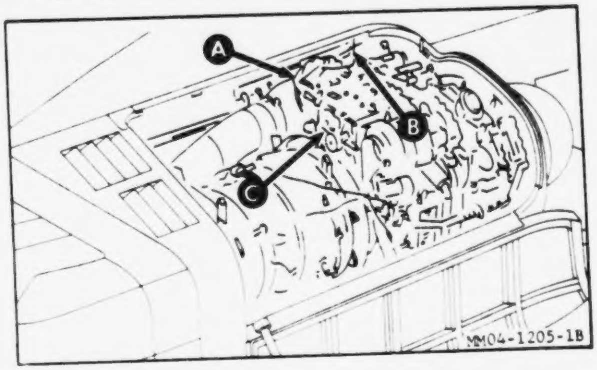
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R10 Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access panel R200 removed; access door RN1 opened.



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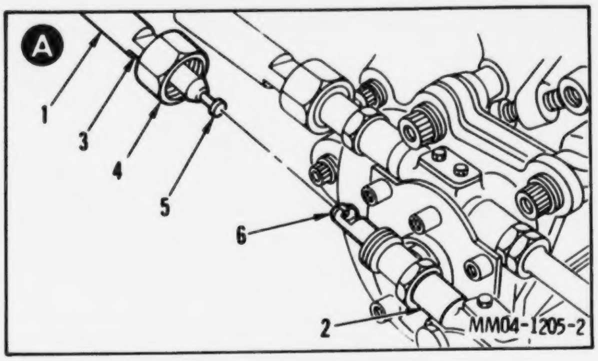
4-8-30. NO. 2 ENGINE LOAD DEMAND SPINDLE AFT CABLE REMOVAL 4-8-30

1. **Disconnect aft cable (1) from gearbox (2).**

   a. Hold cable flats (3) and remove coupling nut (4).

   b. Disconnect cable fitting (5) from gearbox fitting (6).


A
1
3
4
5
6
2
MM04-1205-2

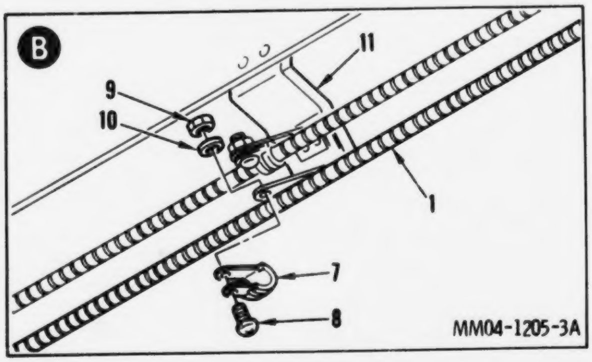
2. **Remove clamp (7) from bracket (11).**

   a. Hold screw (8).

   b. Remove nut (9) and washer (10).

   c. Remove screw (8) from clamp (7) and bracket (11).

   d. Remove clamp (7) from cable (1).


B
11
9
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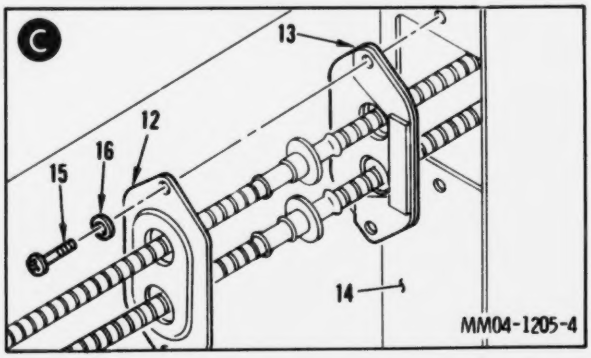
8
MM04-1205-3A

3. **Remove fireseals (12) and (13) from louver enclosure (14).** Remove two screws (15) and washers (16).


C
13
12
16
15
14
MM04-1205-4

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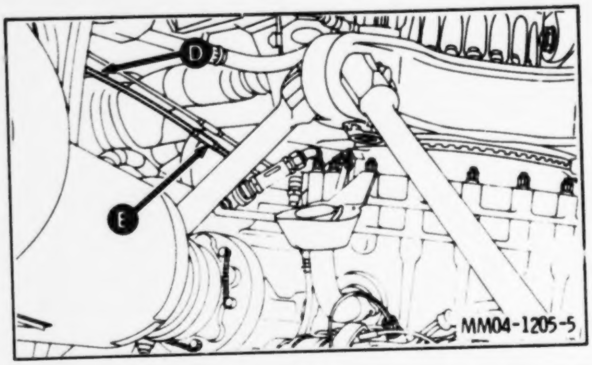
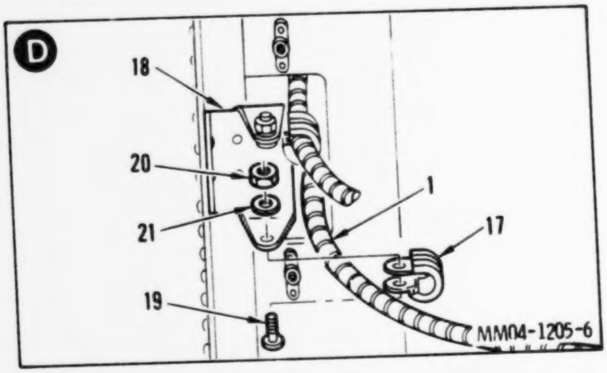
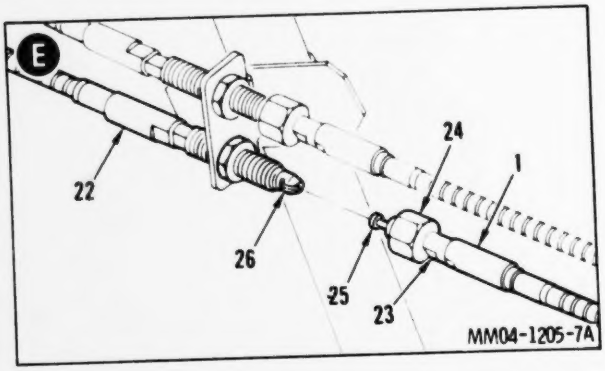
4-8-30. NO. 2 ENGINE LOAD DEMAND SPINDLE AFT CABLE REMOVAL (cont) 4-8-30


D
E
MM04-1205-5

4. **Remove clamp (17) from bracket (18).**
   - a. Hold screw (19).
   - b. Remove nut (20) and washer (21).
   - c. Remove screw (19) from clamp (17) and bracket (18).
   - d. Remove clamp (17) from cable (1).


D
18
20
21
1
17
19
MM04-1205-6

5. **Disconnect aft cable (1) from forward cable (22).**
   - a. Hold cable flats (23).
   - b. Remove coupling nut (24) from cable (22).
   - c. Disconnect aft cable fitting (25) from forward cable fitting (26).


E
24
1
22
26
25
23
MM04-1205-7A

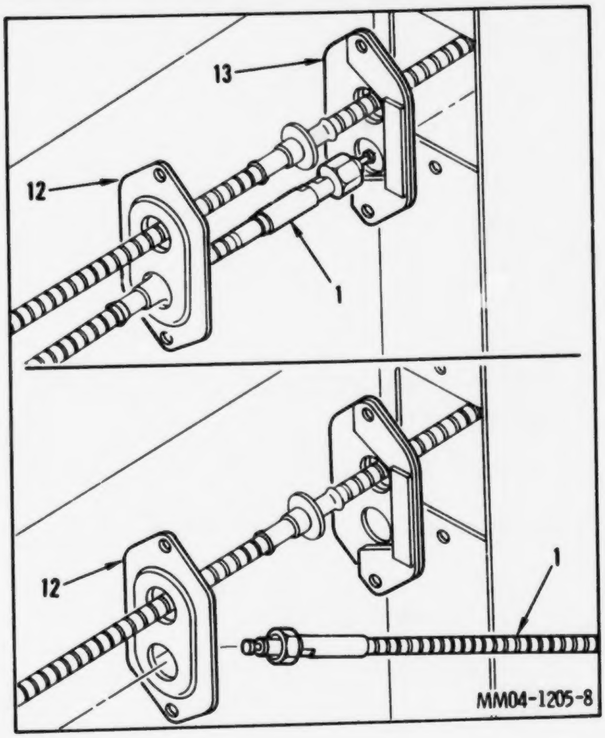
GO TO NEXT PAGE

4-8-30. NO. 2 ENGINE LOAD DEMAND SPINDLE AFT CABLE REMOVAL (cont) 4-8-30

6. Remove cable (1) from fireseals (12) and (13).

a. Pull cable (1) aft until clear of forward fireseal (13).

b. Pull cable (1) forward until clear of aft fireseal (12).



B. CLEANING

Wipe cable support bracket and fireseals with a clean rag.

C. INSPECTION

1. **Check cable support bracket and fireseals for cracks.** None allowed.
2. **Check cable support bracket and fireseals for corrosion** (para 1-5-38).

END OF TASK

4-8-31. NO. 2 ENGINE LOAD DEMAND SPINDLE AFT CABLE INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Scale, Dial Indicating	6670-00-240-5821

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

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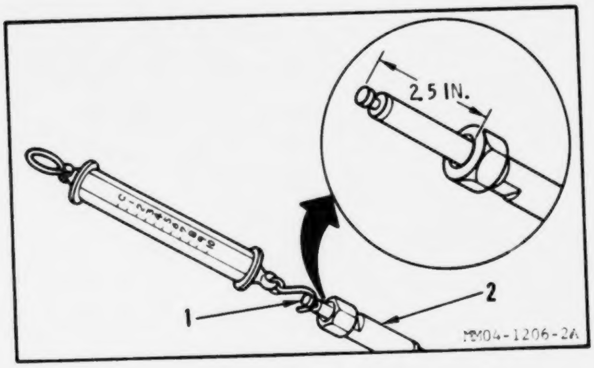
1. **Check cable ribbon (1) for friction load.**

   a. Place cable (2) on flat surface. Be sure cable (2) is not bent or twisted.

   b. Slide ribbon (1) 2-1/2 inches in and out of cable (2). There should be no binding, stiffness, or jamming.

   c. Check friction load of ribbon (1). Load not to exceed 1-1/2 pounds. Use dial indicating scale.

   d. If ribbon movement is rough or friction load exceeds 1-1/2 POUNDS, replace cable.



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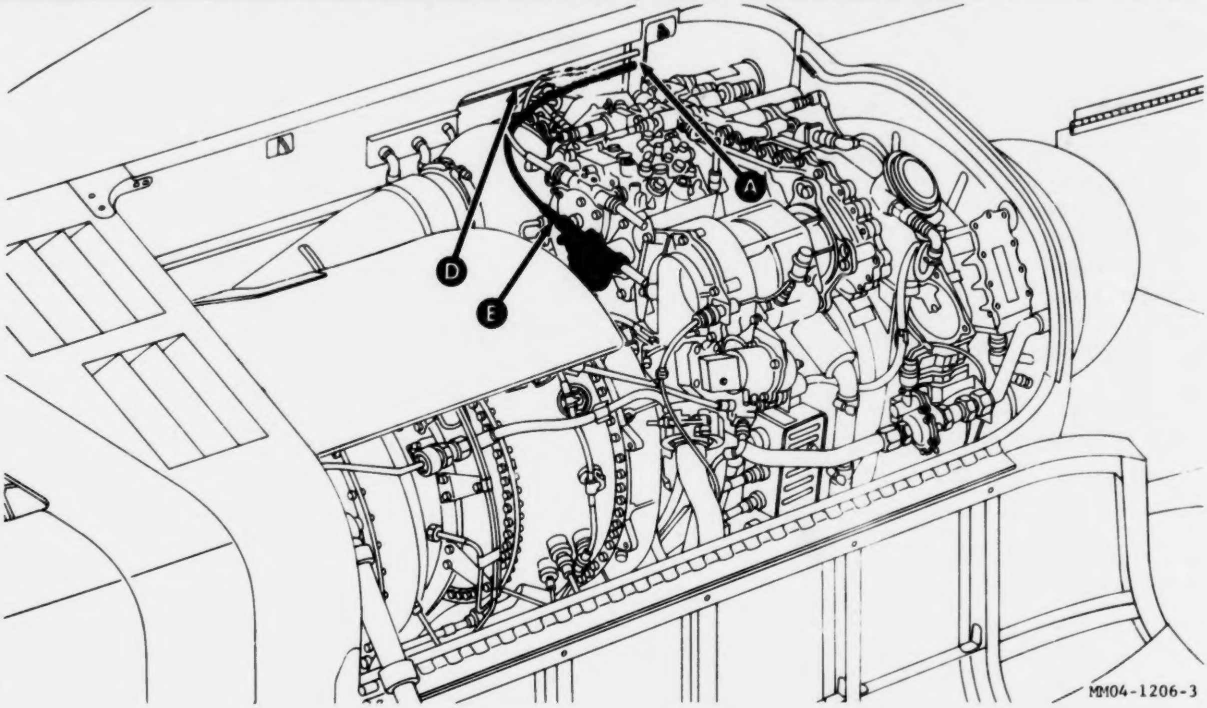
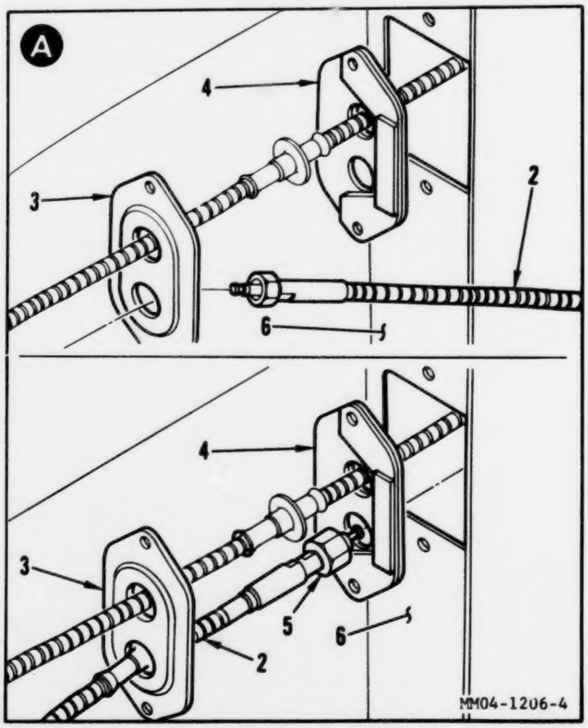
4-8-31. NO. 2 ENGINE LOAD DEMAND SPINDLE AFT CABLE INSTALLATION (cont) 4-8-31


A
D
E
MM04-1206-3

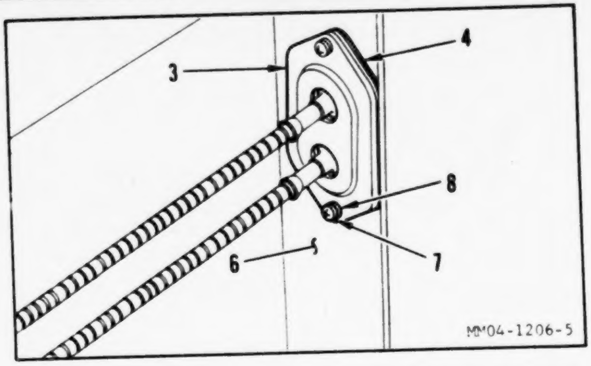
2. Install cable (2) through aft fireseal (3) and forward fireseal (4).
   a. Insert end of cable (2) aft through aft fireseal (3).
   b. Pull cable (2) aft through aft fireseal (3).
   c. Insert coupling nut (5) through forward fireseal (4) and louver enclosure (6).


A
4
3
2
6
4
3
5
6
2
MM04-1206-4

GO TO NEXT PAGE

4-8-31. NO. 2 ENGINE LOAD DEMAND SPINDLE AFT CABLE INSTALLATION (cont) 4-8-31

3. Install fireseals (3) and (4) on louver enclosure (6). Install two washers (8) and screws (7).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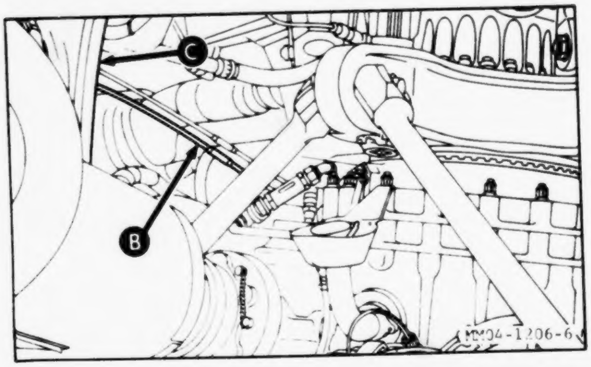
6
5
7
MM04-1206-5


C
B
MM04-1206-6

4. Connect aft cable (2) to forward cable (9).

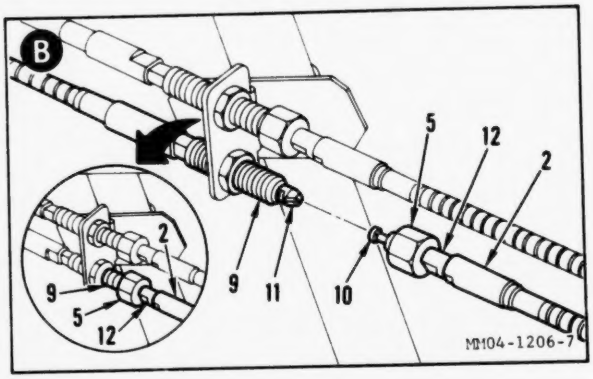
   a. Connect aft cable (2) fitting (10) to forward cable (9) fitting (11).

   b. Install coupling nut (5) on forward cable (9).

5. Torque coupling nut (5) to 70 INCH-POUNDS.

   a. Hold cable (2) at wrench flats (12).

   b. Torque nut (5) to 70 INCH-POUNDS.


B
5
12
2
2
9
5
12
9
11
10
MM04-1206-7

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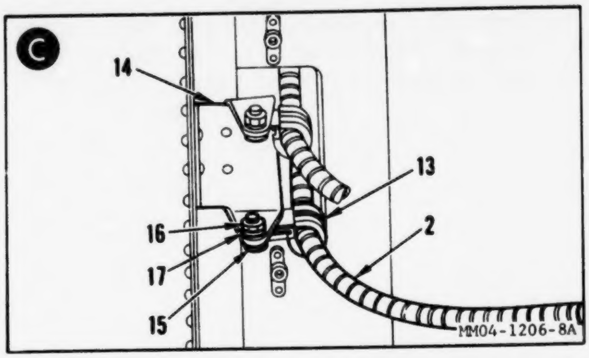
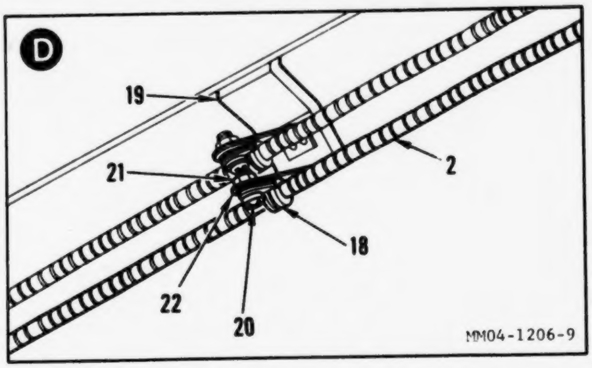
4-8-31. NO. 2 ENGINE LOAD DEMAND SPINDLE AFT CABLE INSTALLATION (cont) 4-8-31

6. **Install clamp (13) on bracket bracket (14).**
    a. Position clamp (13) on aft cable (2).
    b. Install screw (15) through clamp (13) and bracket (14).
    c. Hold screw (15).
    d. Install washer (17) and nut (16).

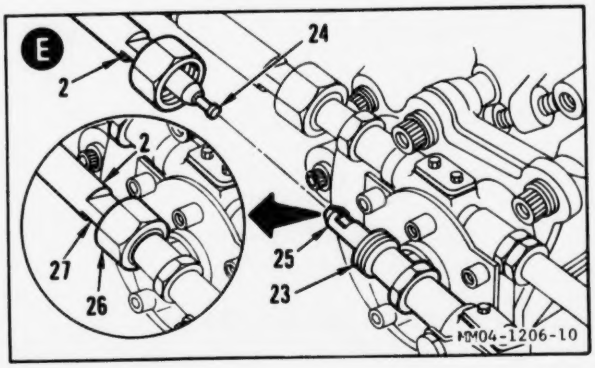
7. **Install clamp (18) on bracket (19).**
    a. Position clamp (18) on aft cable (2).
    b. Insert screw (20) through clamp (18) and bracket (19).
    c. Hold screw (20).
    d. Install washer (22) and nut (21).





8. **Connect aft cable (2) to gearbox (23).**
    a. Connect cable fitting (24) to gearbox fitting (25).
    b. Install coupling nut (26) on gearbox (23).

9. **Torque nut (26) to 70 INCH-POUNDS.**
    a. Hold cable flats (27).
    b. Torque nut (26) to **70 INCH-POUNDS.**



10. **Inspect (TI).**

11. **Perform No. 1 and No. 2 engine load demand spindle rigging check** (para 4-8-34).

12. **Perform power plant operational check (engine 2)** (TM 55-1520-238-T).

13. **Secure access panel R200 and access door RN1** (para 2-2-2).

END OF TASK

4-8-32. NO. 1 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING 4-8-32

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-117-4832
Rigging Kit, Control Systems	1730-01-181-9270
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Gage, Gap Setting	5210-01-053-2571

Materials/Parts:

	Cotter Pin (3)
(E29)	Lockwire

Personnel Required:

67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

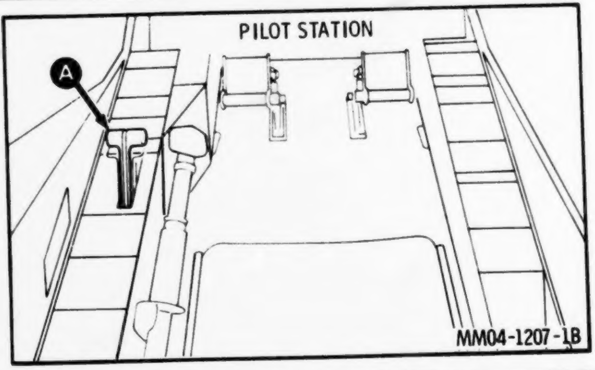
References:

TM 55-1520-238-T

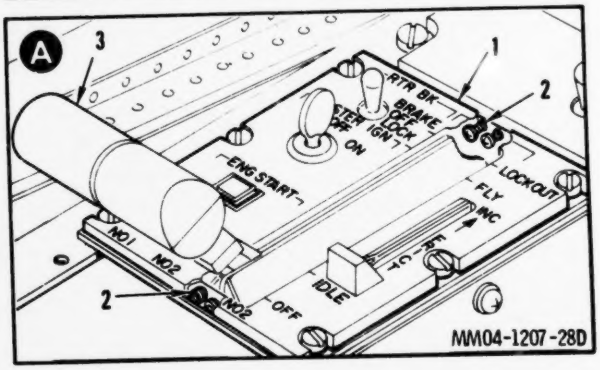
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-2-5	No. 1 engine shroud removed
9-6-9	Pilot EXT LT/INTR LT panel removed
10-2-96	Pilot fuel panel removed
9-6-10	CPG INTR LT panel removed
10-2-95	CPG fuel panel removed
2-2-2	Access door LN1 opened
	Console panels PL1 and PL3 removed
	Console panels CL1 and CL3 removed

1. **Enter pilot station (para 1-7-1). Observe all safety precautions.**


PILOT STATION
A
MM04-1207-1B

2. **At pilot power quadrant (1), set two stop screws (2) all the way in for maximum lever (3) travel.**


A
3
1
2
RTR BK
BRAKE
OFF
LOCK
STER IGN
OFF
ON
ENG START
LOCKOUT
FLY
INC
NO1
NO2
2
NO2
OFF
IDLE
MM04-1207-28D

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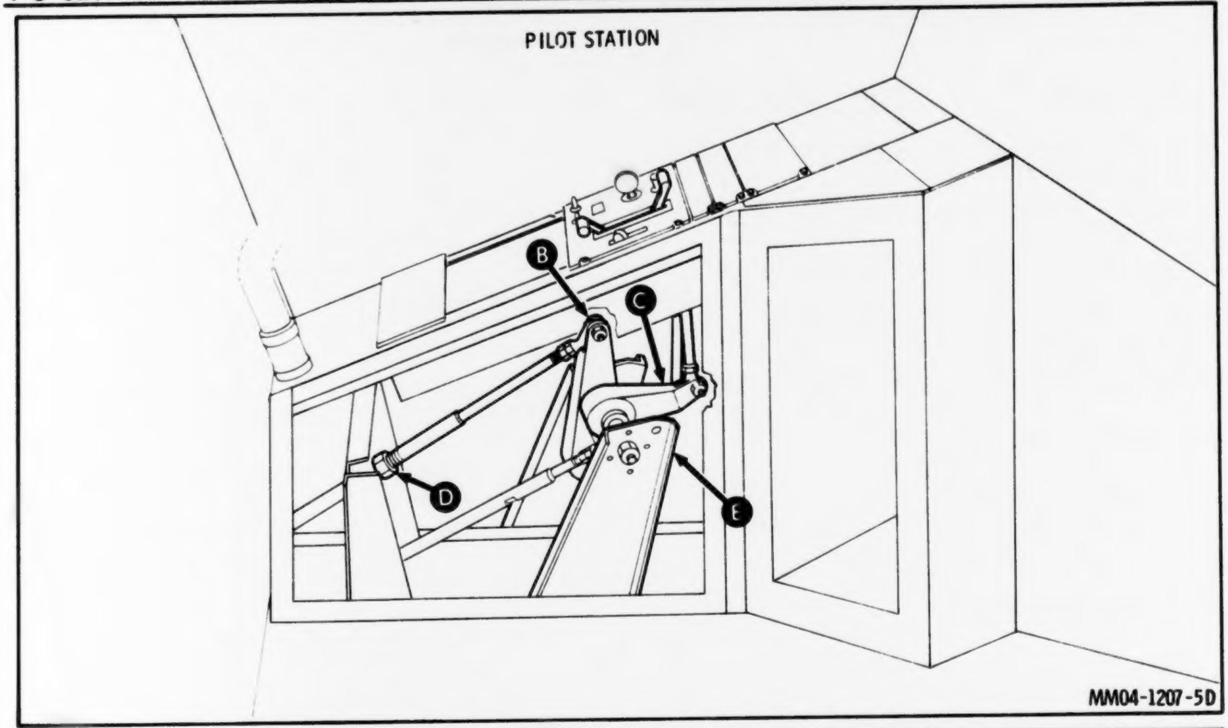
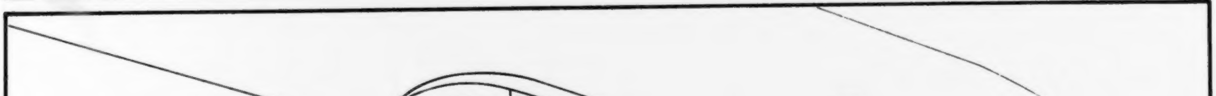
4-8-32. NO. 1 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-32


PILOT STATION
B
C
D
E
MM04-1207-5D


F
MM04-1207-6C

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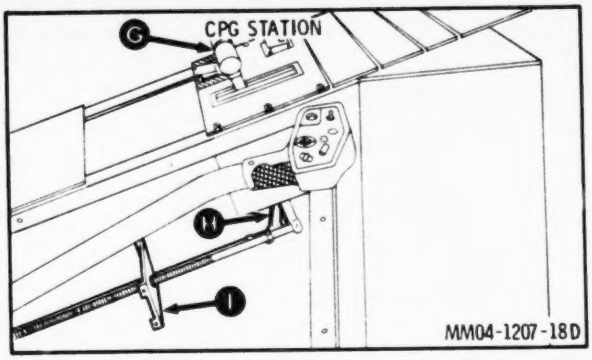
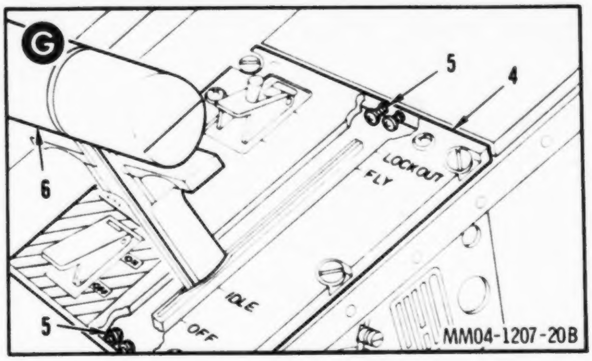
4-8-32. NO. 1 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-32

3. Enter CPG station (para 1-7-1) Observe all safety precautions.

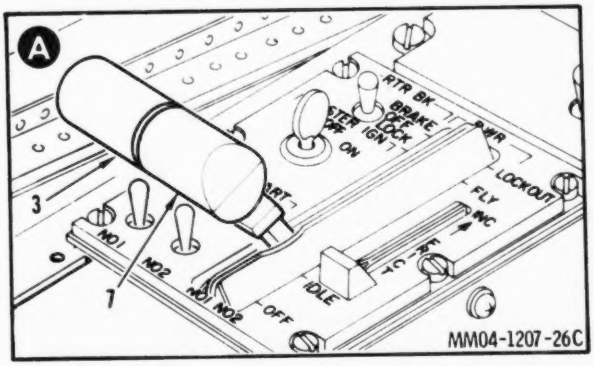

G
CPG STATION
H
I
MM04-1207-18D

4. At CPG power quadrant (4), set two stop screws (5) all the way in for maximum lever (6) travel.


G
5
4
LOCKOUT
FLY
6
IDLE
OFF
5
MM04-1207-20B

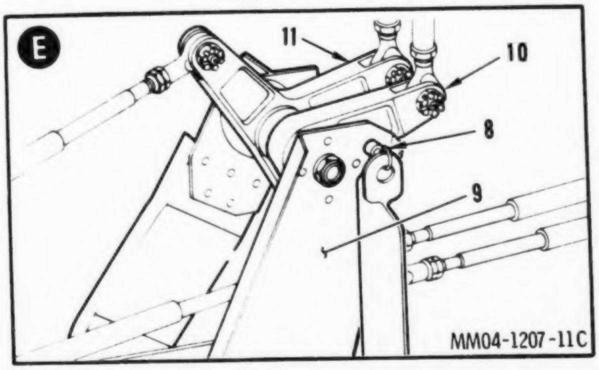
5. Move pilot power levers No. 1 (3) and No. 2 (7) to IDLE.

6. Insert rig pin (8) fully into bracket (9) and bellcranks (10) and (11). Use -3 rig pin.


A
RTR BK
BRAKE
OFF
LOCK
STEER
OFF
IGN
ON
PWR
LOCKOUT
FLY
INC
3
NO1
NO2
NO1
NO2
7
IDLE
OFF
MM04-1207-26C

NOTE

If bellcrank does not aline, go to step 7. If bellcrank does aline, proceed to step 14.


E
11
10
8
9
MM04-1207-11C

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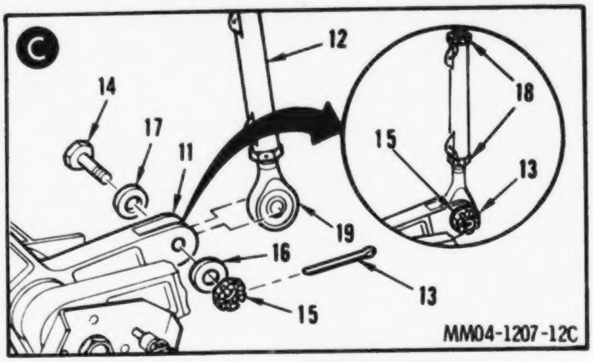
4-8-32. NO. 1 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-32

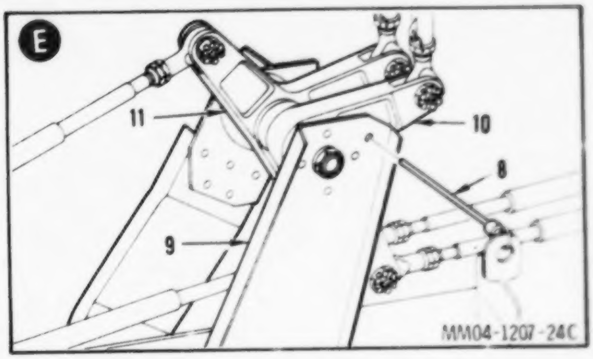


7. **Adjust No. 1 power quadrant control rod (12) to aline with bellcrank (11).**
   a. Remove and discard cotter pin (13).
   b. Hold bolt (14).
   c. Remove nut (15) and washer (16).
   d. Remove bolt (14) and washer (17) from bellcrank (11) and control rod (12).
   e. Remove lockwire from control rod (12).
   f. Loosen two jam nuts (18) at ends of control rod (12).
   g. Adjust length of control rod (12) as needed. Aline control rod end (19) with bellcrank (11).
8. **Connect No. 1 power quadrant control rod (12) to bellcrank (11).**
   a. Insert bolt (14) with washer (17) through bellcrank (11) and rod end (19).
   b. Hold bolt (14).
   c. Install washer (16) and nut (15) on bolt (14).
9. **Torque nut (15) 14 to 18 INCH-POUNDS.** Use 1/4 drive torque wrench (0 to 30 INCH-POUNDS).
   a. Hold bolt (14). Torque nut (15) to **14 INCH-POUNDS.**
   b. Increase torque to aline cotter pin holes, but do not exceed **18 INCH-POUNDS.**
   c. Install new cotter pin (13).
10. **Torque two nuts (18) to 20 INCH-POUNDS.** Use 1/4 drive torque wrench (0 to 30 INCH-POUNDS). Lockwire two nuts (18). Use lockwire (E29).

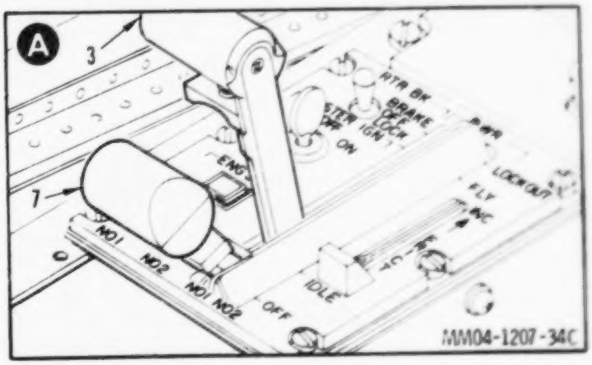
GO TO NEXT PAGE

4-8-32. NO. 1 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-32

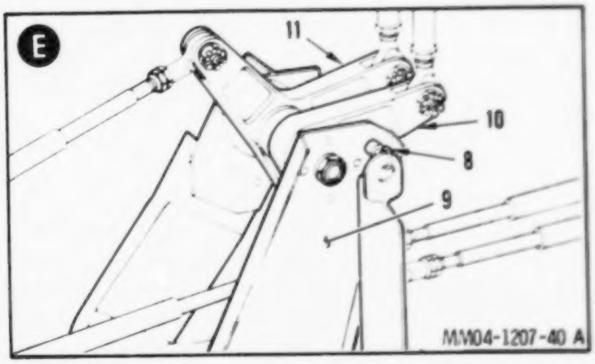
11. Remove rig pin (8) from bracket (9) and bellcranks (10) and (11).


E
11
10
8
9
MM04-1207-24C

12. Move power levers No. 1 (3) and No. 2 (7) to OFF, IDLE, FLY, LOCKOUT, and back to IDLE.


A
3
7
RTR BK
BRAKE
OFF
LOCK
STER
OFF
ON
IGN
ENG
PWR
LOCKOUT
FLY
INC
NO1
NO2
NO1
NO2
OFF
IDLE
MM04-1207-34C

13. Insert rig pin (8) fully into bracket (9) and bellcranks (10) and (11). Use -3 rig pin.


E
11
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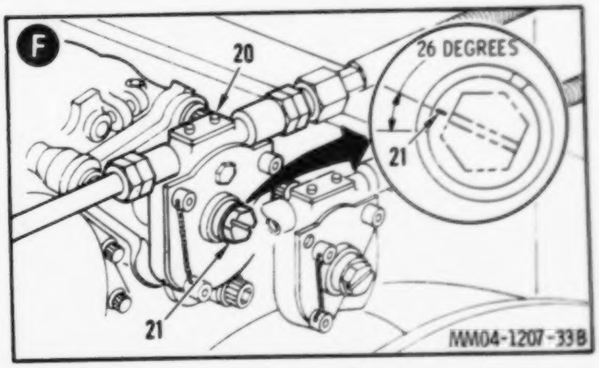
8
9
MM04-1207-40 A

14. At PAS gearbox (20), verify pinion shaft (21) is at 26-DEGREE position.


F
20
26 DEGREES
21
21
MM04-1207-33B

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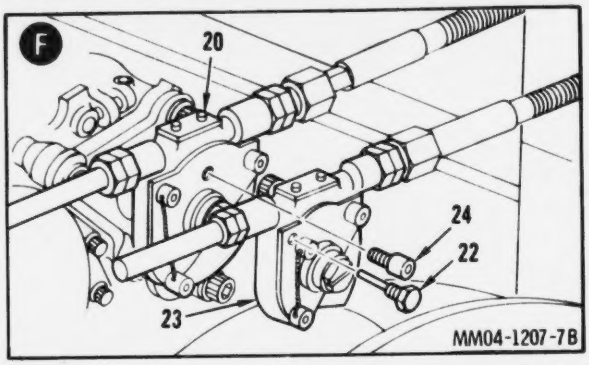
4-8-32. NO. 1 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-32

15. **Remove rig pin (22) from load demand spindle (LDS) gearbox (23).** Remove lockwire and remove rig pin (22).

16. **Remove capscrew (24) from PAS gearbox (20).** Remove lockwire.


F
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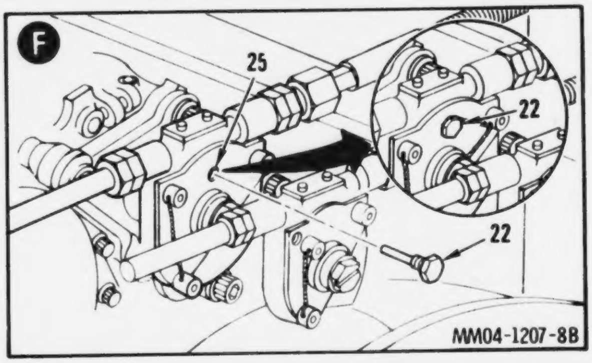
24
22
23
MM04-1207-7B

17. **Insert rig pin (22) in rig pin hole (25).**

NOTE

Rig pin must bottom and lock gearbox pinion in position. If rig pin bottoms and locks, proceed to step 26. If rig pin does not bottom and lock, go to step 18.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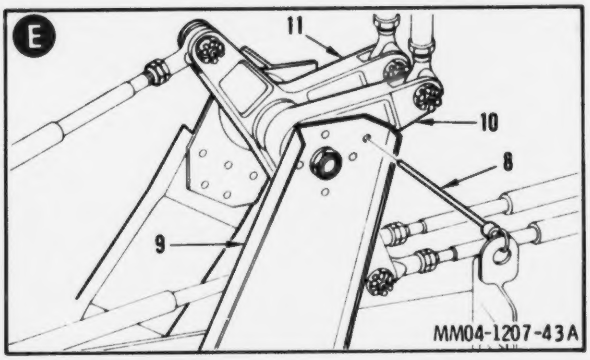
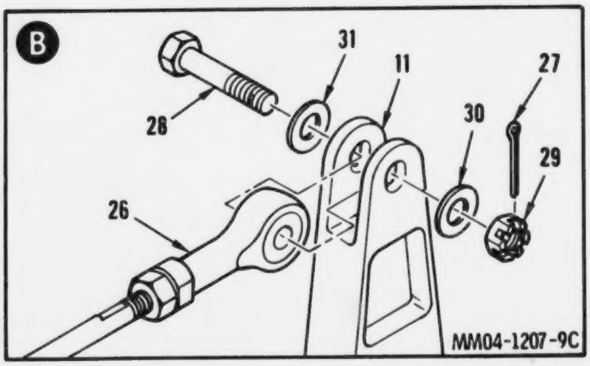
MM04-1207-8B

18. **In pilot station, remove rig pin (8) from bracket (9) and bellcranks (10) and (11).**


E
11
10
8
9
MM04-1207-43A

19. **Position bellcrank (11), to disconnect cable rod end (26).**
    a. Remove and discard cotter pin (27).
    b. Hold bolt (28).
    c. Remove nut (29) and washer (30).
    d. Remove bolt (28) and washer (31).


B
31
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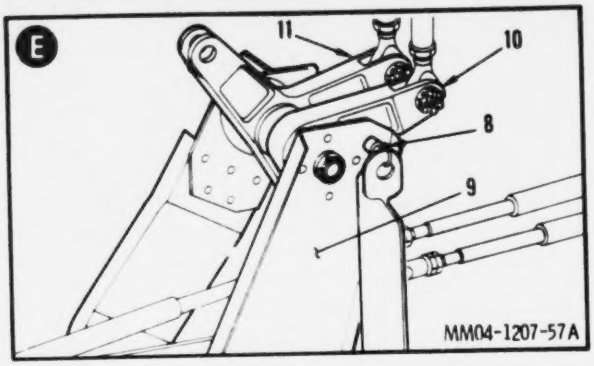
MM04-1207-9C

GO TO NEXT PAGE

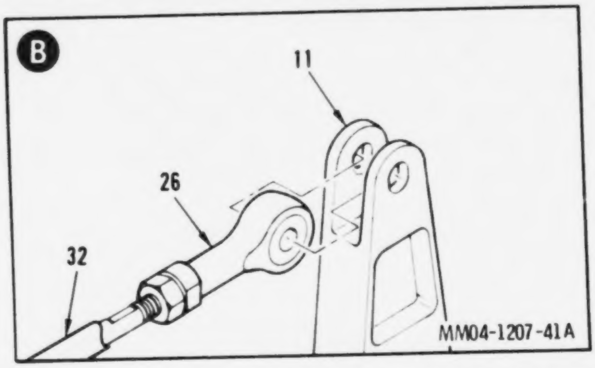
20. **Insert rig pin (8) fully into bracket (9) and bellcranks (10) and (11).** Use -3 rig pin.

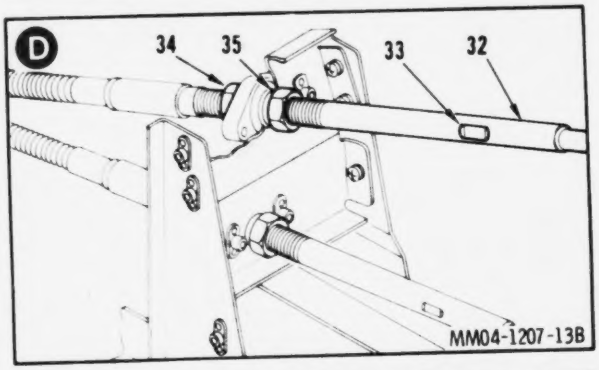

E
11
10
8
9
MM04-1207-57A

21. **Adjust cable (32):**

    a. If rod end (26) requires forward movement, hold cable slots (33) and loosen nut (34). Tighten nut (35) to aline rod end (24) with bellcrank (15).

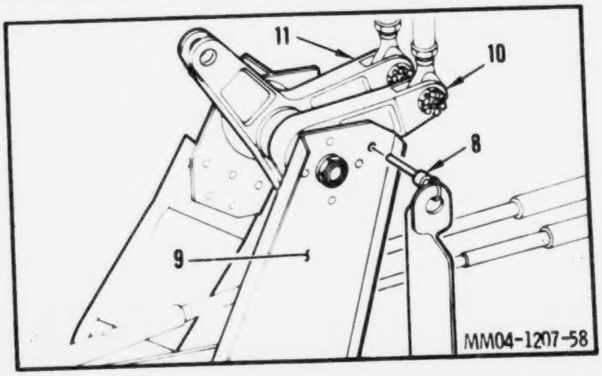
    b. If rod end (26) requires aft movement, hold cable slots (33) and loosen nut (35). Tighten nut (34) to aline rod end (26) to bellcrank (11).


B
11
26
32
MM04-1207-41A


D
34
35
33
32
MM04-1207-13B

22. **Torque two nuts (34) and (35) to 90 INCH-POUNDS.** Hold cable flats (33). Use 1/4 drive torque wrench (30 to 150 INCH-POUNDS).

23. **To connect rod end (26), remove rig pin (8) and position bellcrank (11).**


11
10
8
9
MM04-1207-58

GO TO NEXT PAGE

4-8-32. NO. 1 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-32

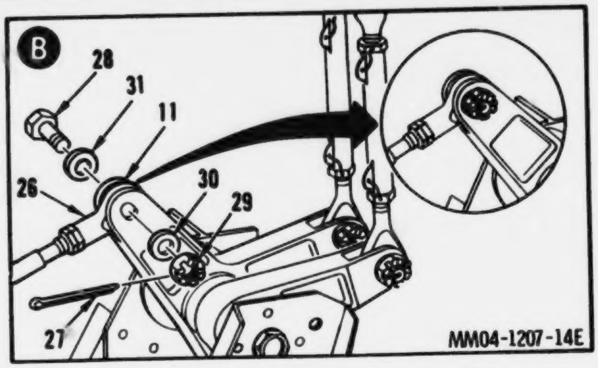
24. **Connect cable rod end (26) to bellcrank (11).**

    a. Position rod end (26) into bellcrank (11).

    b. Install bolt (28) through washer (31), bellcrank (11), and rod end (26).

    c. Hold bolt (28).

    d. Install washer (30) and nut (29) on bolt (28).

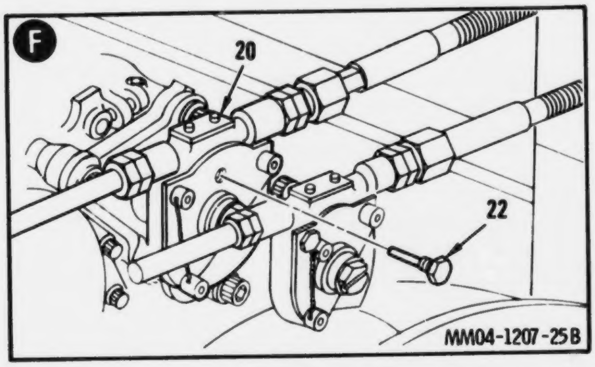

B
28
31
11
26
30
29
27
MM04-1207-14E

25. **Torque nut (29) 14 to 18 INCH-POUNDS.** Use 1/4 drive torque wrench (0 to 30 INCH-POUNDS).

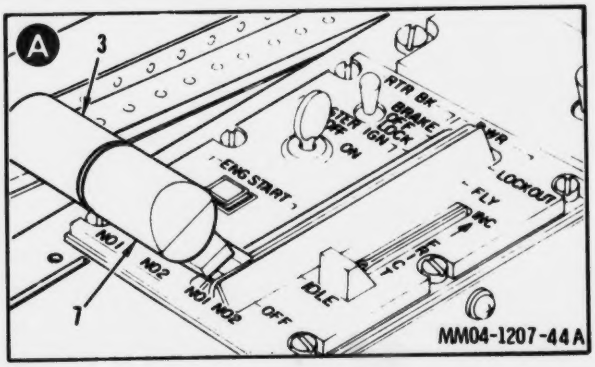
    a. Hold bolt (28) and torque nut (29) to **14 INCH-POUNDS.**

    b. Increase torque to aline cotter pin holes, but do not exceed **18 INCH-POUNDS.**

26. **Remove rig pin (22) from PAS gearbox (20).**


F
20
22
MM04-1207-25B

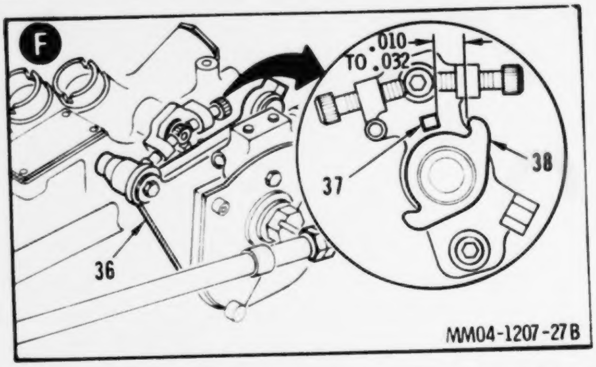
27. **Move pilot power levers (3) and (7) to OFF position.**


A
3
RTR BK
BRAKE
OFF
LOCK
STEER
OFF ON
IGN
ENG START
PWR
LOCKOUT
FLY
INC
NO1
NO2
NO1 NO2
IDLE
OFF
7
MM04-1207-44A

GO TO NEXT PAGE

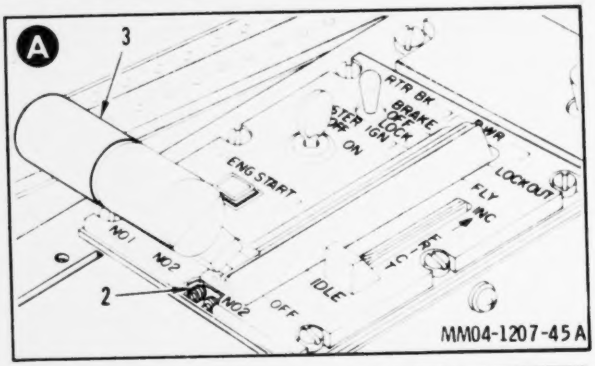
4-8-32. NO. 1 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-32

28. **At hydromechanical unit (HMU) spindle gearbox (36), obtain 0.010 to 0.032-INCH GAP between spindle stop (37) and spindle cam (38).**

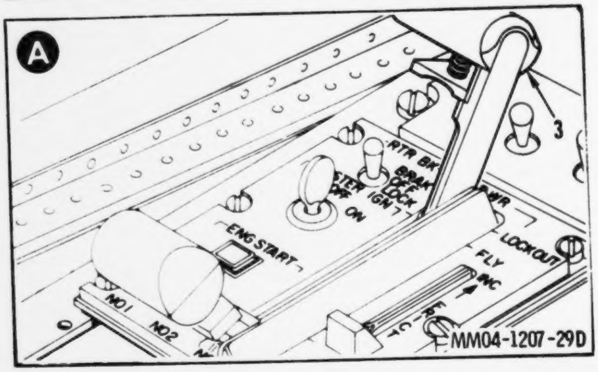

F
.010
TO .032
37
38
36
MM04-1207-27B

29. **Adjust pilot No. 1 power lever (3) OFF stop screw (2).**

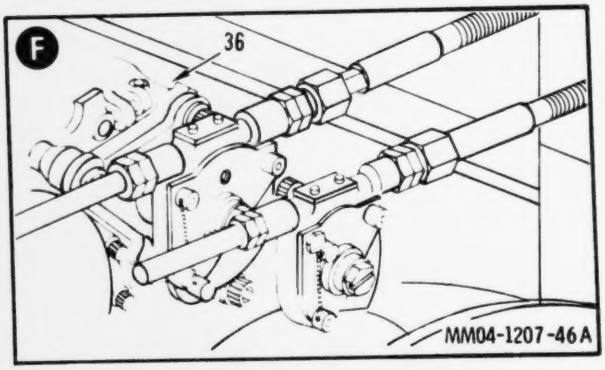
    With lever (3) in OFF position, adjust screw (2) until it touches power lever (3).


A
3
2
RTR BK
BRAKE
OFF
LOCK
STER IGN
OFF ON
ENG START
NO1
NO2
NO2
IDLE
OFF
PWR
LOCKOUT
FLY
INC
MM04-1207-45A

30. **Move pilot No.1 power lever (3) to LOCKOUT position.**


A
3
RTR BK
BRAKE
OFF
LOCK
STER IGN
OFF ON
ENG START
NO1
NO2
PWR
LOCKOUT
FLY
INC
MM04-1207-29D

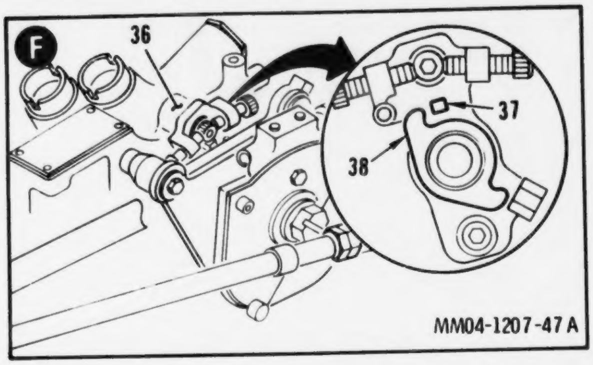
31. **Verify audible click from HMU (36).**


F
36
MM04-1207-46A

GO TO NEXT PAGE

4-8-32. NO. 1 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-32

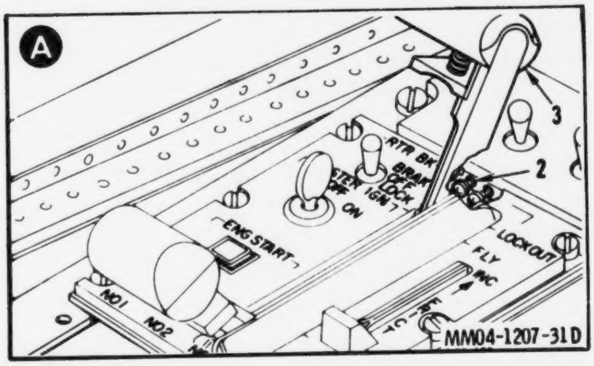
32. At HMU (36), verify that spindle cam (38) does not contact spindle stop (37).



MM04-1207-47 A

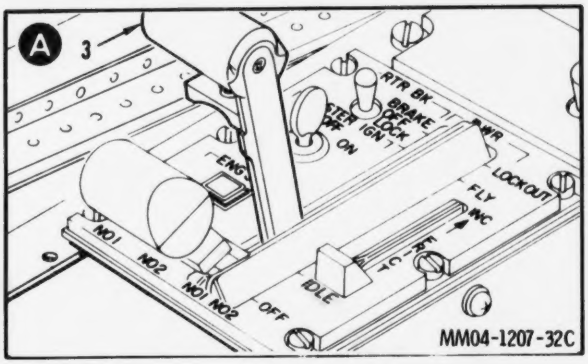
33. Adjust pilot No. 1 power lever (3) maximum screw (2) stop.

    With lever in LOCKOUT, adjust screw (2) until it touches power lever (3).


A
3
2
RTR BK
BRAKE
OFF
LOCK
STER IGN
OFF ON
ENG START
LOCKOUT
FLY
INC
NO1
NO2

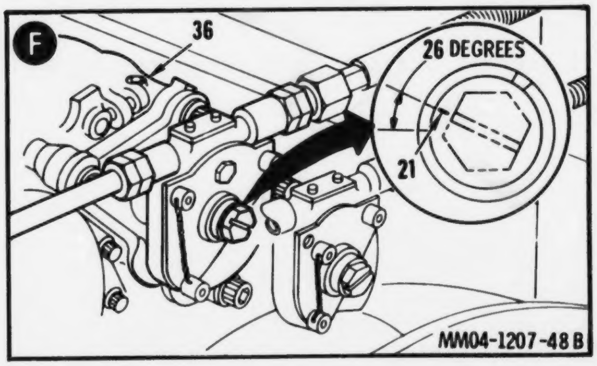
MM04-1207-31 D

34. Move pilot No. 1 power lever (3) to IDLE.


A
3
RTR BK
BRAKE
OFF
LOCK
STER IGN
OFF ON
ENG
PWR
LOCKOUT
FLY
INC
NO1
NO2
NO1 NO2
OFF
IDLE

MM04-1207-32C

35. Verify audible click from HMU (36) and that PAS gearbox pinion shaft (21) is in 26-DEGREE position.

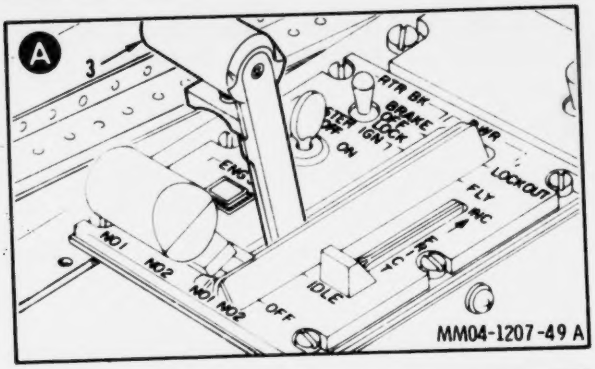

F
36
26 DEGREES
21

MM04-1207-48 B

GO TO NEXT PAGE

4-8-32. NO. 1 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-32

36. Move pilot No. 1 power lever (3) to OFF, IDLE, FLY, LOCKOUT, and back to IDLE.

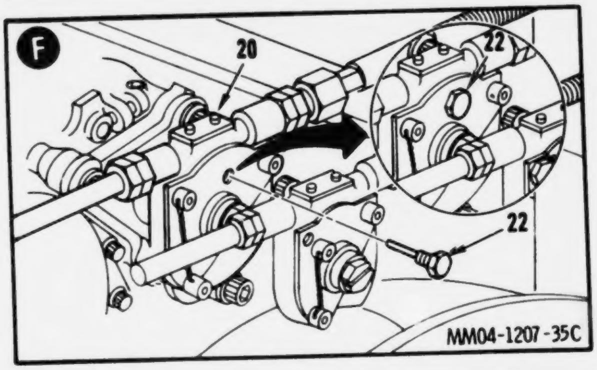

A
3
RTR BK
BRAKE
OFF
LOCK
STEP
OFF ON
IGN
PWR
ENG
LOCKOUT
FLY
INC
NO1
NO2
NO1 NO2
OFF
IDLE
MM04-1207-49 A

NOTE

If rig pin cannot be installed, repeat steps 11 through 40.

37. Insert rig pin (22) in PAS gearbox (20).

38. Remove rig pin (22) from PAS gearbox (20).

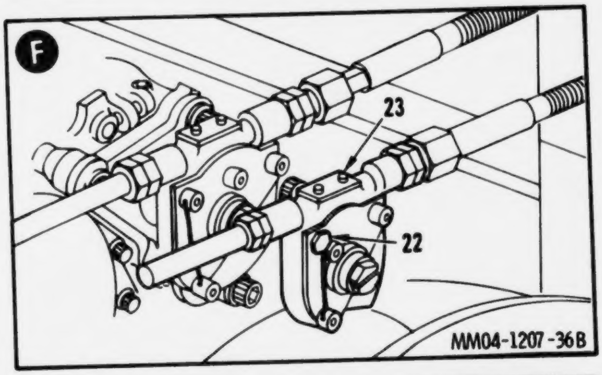

F
20
22
22
MM04-1207-35C

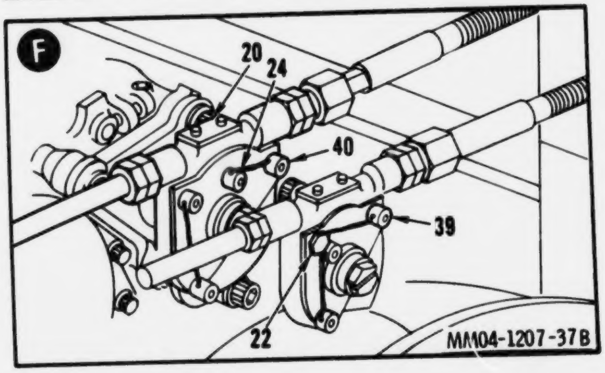
39. Stow rig pin (22) in LDS gearbox (23).

40. Install capscrew (24) in PAS gearbox (20).

41. Lockwire rig pin (22) to capscrew (39). Use lockwire (E29).

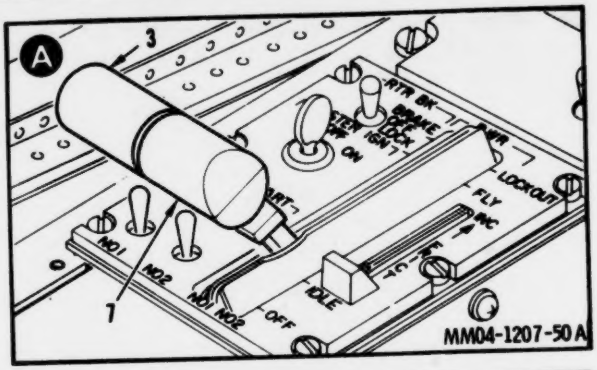
42. Lockwire capscrew (24) to capscrew (40). Use lockwire (E29).


F
23
22
MM04-1207-36B

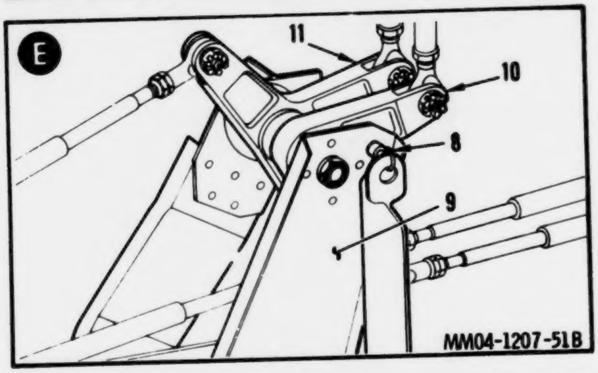

F
20
24
40
39
22
MM04-1207-37B

GO TO NEXT PAGE

43. Move pilot power levers No. 1 (3) and No. 2 (7) to IDLE position.


A
3
7
RTR BK
BRAKE
LOCK
PWR
LOCKOUT
FLY
NO1
NO2
NO1 NO2
IDLE
OFF
ON
MM04-1207-50A

44. At pilot station, insert rig pin (8) fully into bracket (9) and bellcranks (10) and (11). Use -3 rig pin.


E
11
10
8
9
MM04-1207-51B

45. Verify No. 1 CPG power lever (6) is in IDLE.

NOTE

If power lever alines with IDLE position, proceed to step 54.

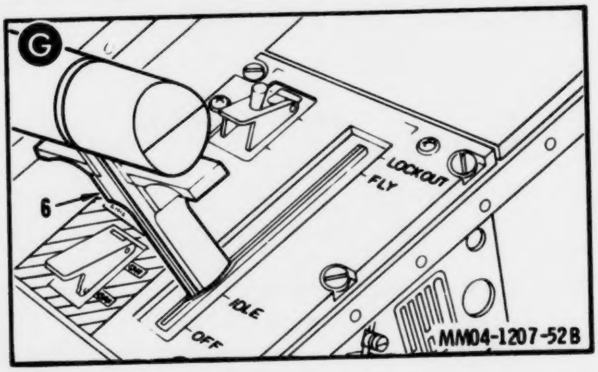
46. Disconnect cable rod end (41) from No. 1 CPG power quadrant power lever (6).

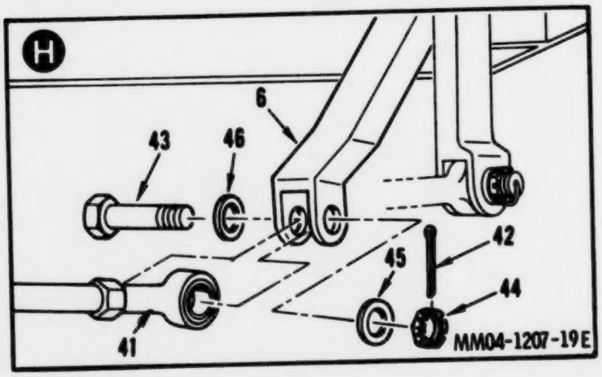
a. Remove and discard cotter pin (42).

b. Hold bolt (43).

c. Remove nut (44) and washer (45).

d. Remove bolt (43) and washer (46) from power lever (6) and rod end (41).


G
6
LOCKOUT
FLY
IDLE
OFF
MM04-1207-52B


H
6
43
46
42
45
44
41
MM04-1207-19E

GO TO NEXT PAGE

4-8-32. NO. 1 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont)

47. **Adjust cable (47).**

    a. If rod end (41) requires forward movement, hold cable slots (48) and loosen nut (49). Tighten nut (50) to aline rod end (41) with power lever (6).

    b. If rod end (41) requires aft movement, hold cable slots (48) and loosen nut (50). Tighten nut (49) to aline rod end (41) with power lever (6).

48. **Connect cable rod end (41) to No. 1 CPG power lever (6).**

    a. Position rod end (41) in power lever (6).

    b. Insert bolt (43) with washer (46) through power lever (6) and rod end (41).

    c. Hold bolt (43).

    d. Install washer (45) and nut (44) on bolt (43).

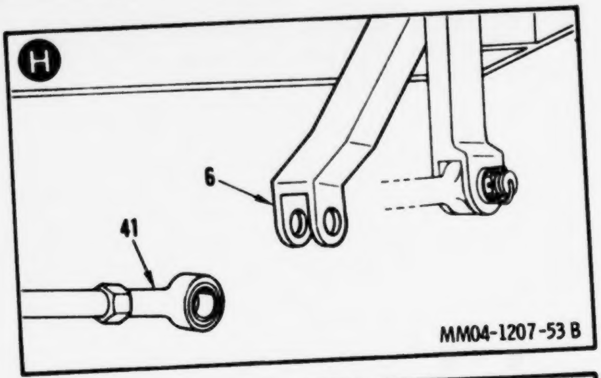
49. **Torque nut (44) 14 to 18 INCH-POUNDS** . Use 1/4 drive torque wrench (0 to 30 INCH-POUNDS).

    a. Hold bolt (43) and torque nut (44) to 14 **INCH-POUNDS.**

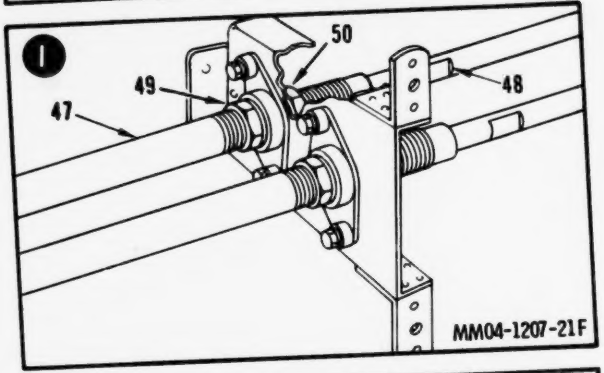
    b. Increase torque to aline cotter pin holes, but do not exceed **18 INCH-POUNDS.**

    c. Install new cotter pin (42).

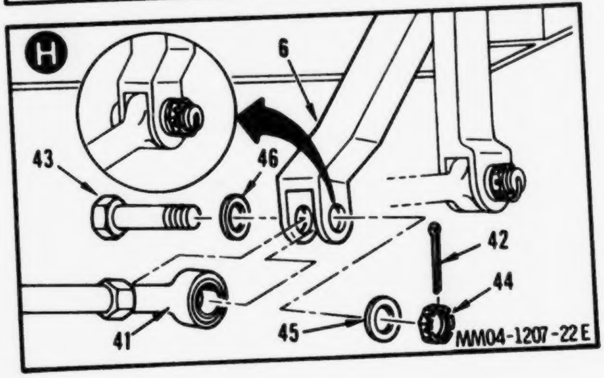
50. **Torque two nuts (49) and (50) to 90 INCH-POUNDS.** Use 1/4 drive torque wrench (30 to 150 INCH-POUNDS). Hold cable slots (48).



MM04-1207-53 B



MM04-1207-21F

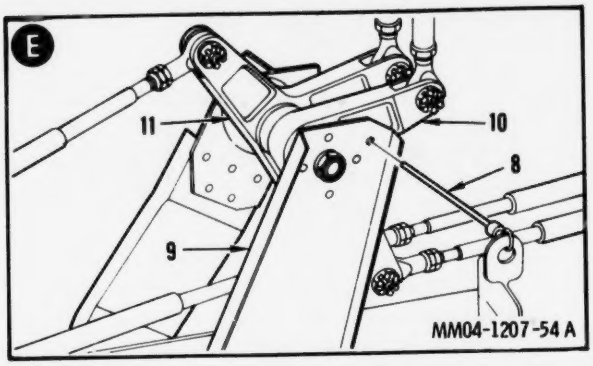


MM04-1207-22E

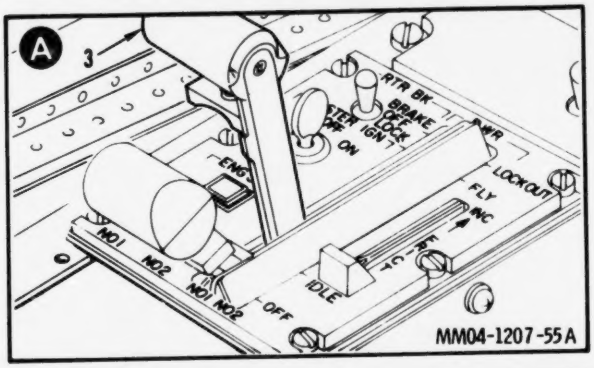
GO TO NEXT PAGE

4-8-32. NO. 1 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-32

51. In pilot station, remove rig pin (8) from bracket (9) and bellcranks (10) and (11).


E
11
10
8
9
MM04-1207-54 A

52. Move pilot No. 1 power lever (3) to OFF, IDLE, FLY, LOCKOUT, and back to IDLE.


A
3
RTR BK
BRAKE
OFF
LOCK
IGN
ON
ENG
PWR
LOCKOUT
FLY
INC
NO1
NO2
NO1 NO2
IDLE
OFF
MM04-1207-55A

53. When pilot No. 1 power lever (3) is moved, verify CPG power lever (6) movement to OFF, IDLE, FLY, LOCKOUT and back to IDLE occurs.

54. Inspect (TI).

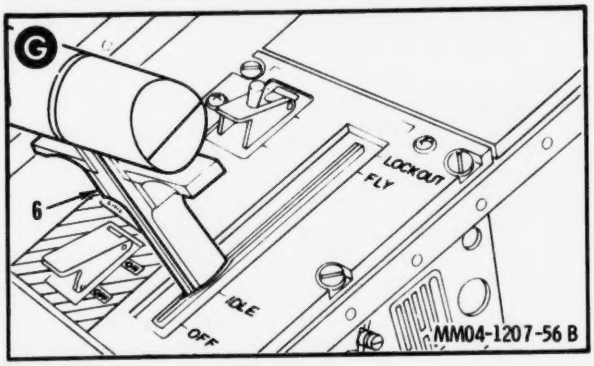
55. Install CPG fuel panel (para 10-2-95).

56. Install CPG INTR LTS panel (para 9-6-10).

57. Install pilot fuel panel (para 10-2-96).

58. Install pilot INTR LTS, EXT LTS panel (para 9-6-9).

59. Perform power plant operational check (engine No. 1) (TM 55-1520-238-T).


G
6
LOCKOUT
FLY
IDLE
OFF
MM04-1207-56 B

GO TO NEXT PAGE

60. Install pilot left consoles PL1 and PL3 (para 2-2-2).

61. Install CPG left consoles CL1 and CL3 (para 2-2-2).

62. Install No. 1 engine shroud (para 4-2-5).

63. Secure access door LN1 (para 2-2-2).

END OF TASK

4-8-33. NO. 2 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING 4-8-33

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrech, Torque, 1/4 Drive	5120-00-117-4832
Rigging Kit, Control Systems	1730-01-181-9270
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Gage, Gap Setting	5210-01-053-2571

Materials/Parts:

	Cotter Pin (3)
(E29)	Lockwire

Personnel Required:

67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

References:

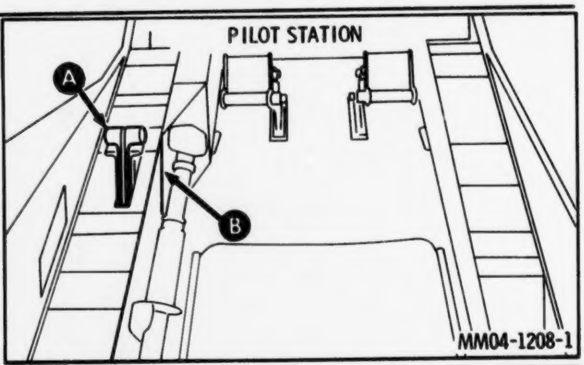
TM 55-1520-238-T

Equipment Conditions:

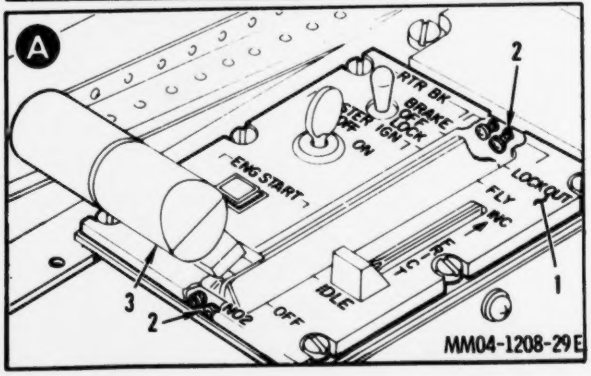
Ref	Condition
1-7-2	Helicopter safed
4-2-9	No. 2 engine shroud removed
9-6-9	Pilot EXT LT/INTR LT panel removed
10-2-96	Pilot fuel panel removed
9-6-10	CPG INTR LT panel removed
10-2-95	CPG fuel panel removed
2-2-2	Access door RN1 opened Console panels PL1 and PL3 removed Console panels CL1 and CL3 removed

---

1. **Enter pilot station (para 1-7-1). Observe all safety precautions.**


PILOT STATION
A
B
MM04-1208-1

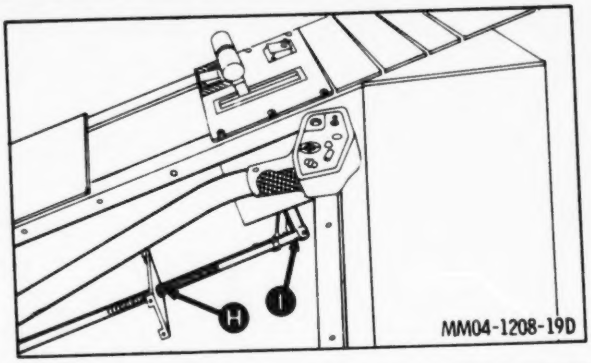
2. **At pilots power quadrant (1), set two stop screws (2) all the way in for maximum lever (3) travel.**


A
2
RTR BK
BRAKE
OFF
LOCK
STER IGN
OFF ON
ENG START
LOCKOUT
FLY
INC
IDLE
OFF
NO2
3
2
1
MM04-1208-29E

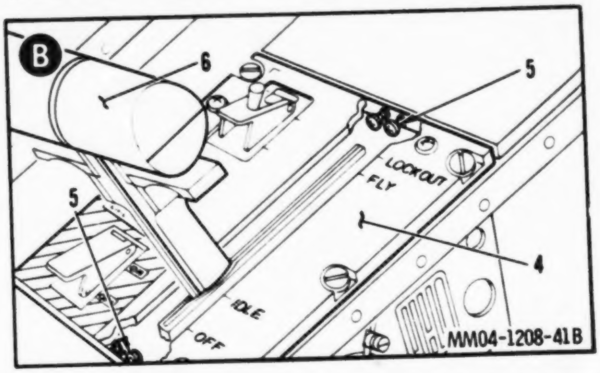
GO TO NEXT PAGE

4-8-33. NO. 2 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-33

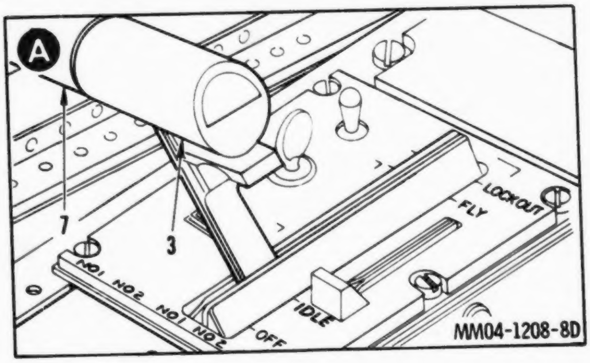
3. Enter CPG station (para 1-7-1)
   Observe all safety precautions.


H
I
MM04-1208-19D

4. At CPG power quadrant (4), set two stop screws (5) all the way in for maximum lever (6) travel.

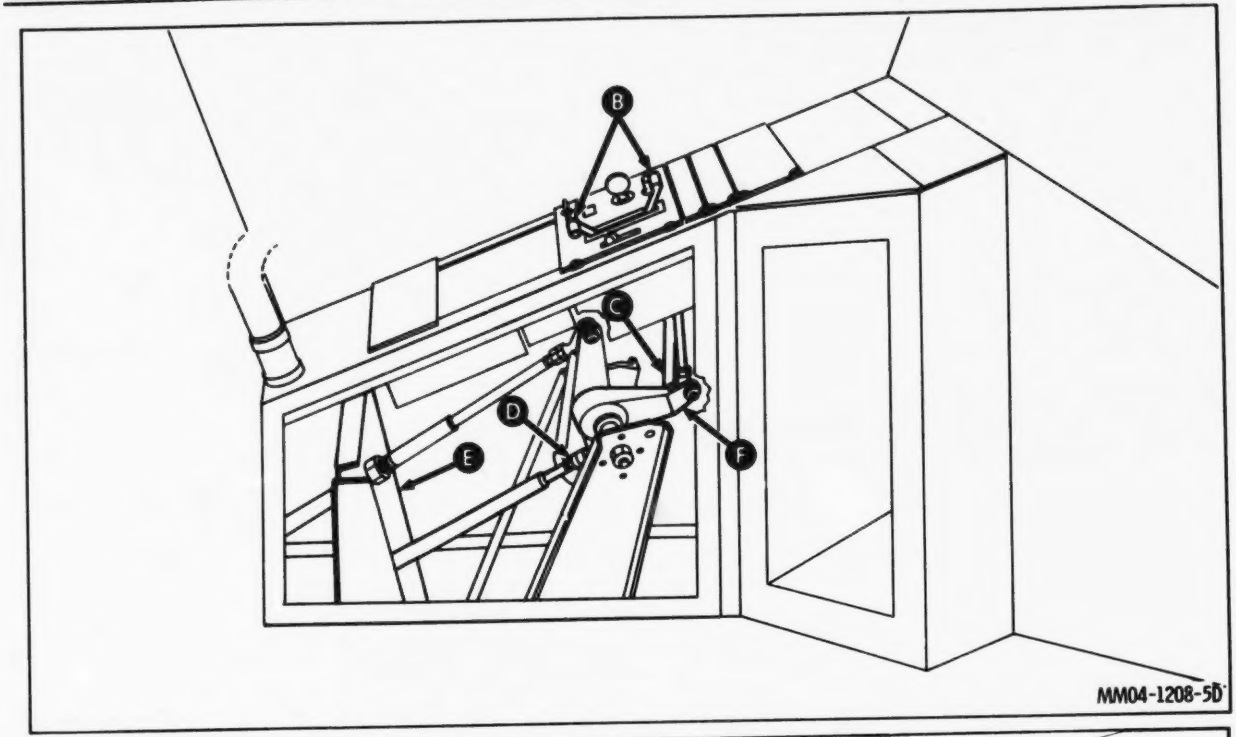

B
6
5
LOCKOUT
FLY
5
4
IDLE
OFF
MM04-1208-41B

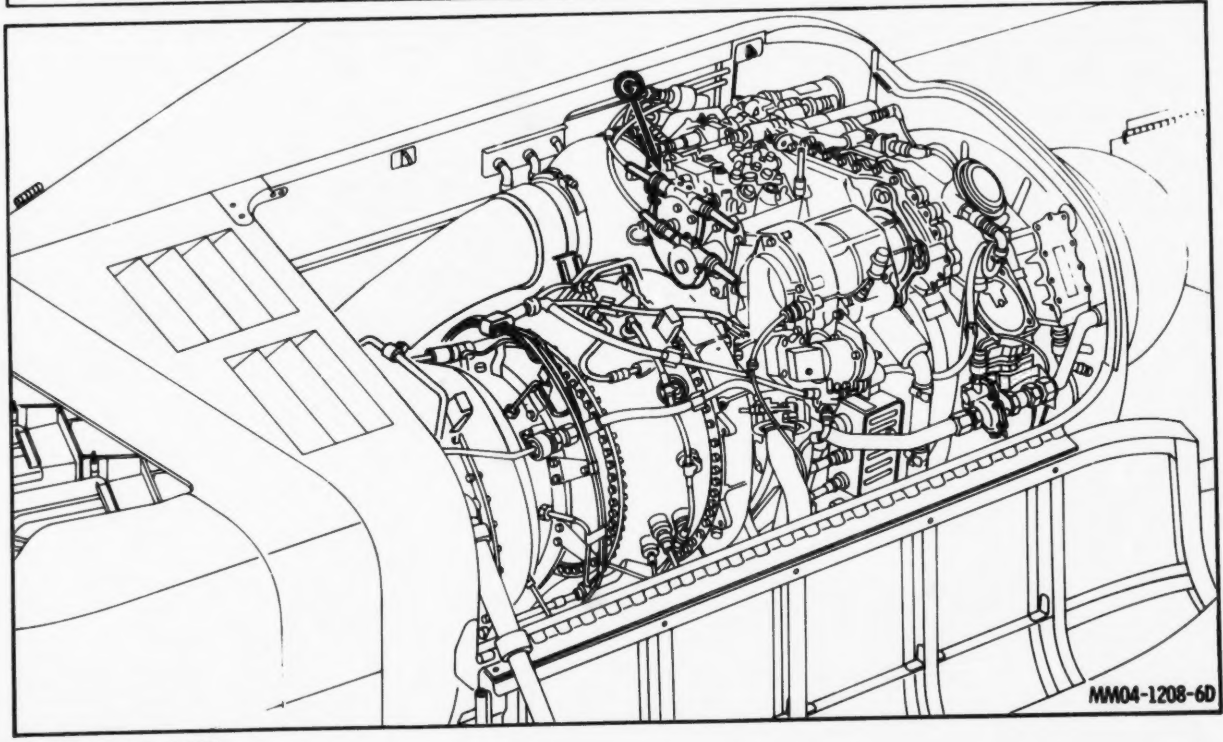
5. Move pilot power levers No. 2 (3) and No. 1 (7)to IDLE.


A
7
3
LOCKOUT
FLY
NO1 NO2 NO1 NO2
IDLE
OFF
MM04-1208-8D

GO TO NEXT PAGE

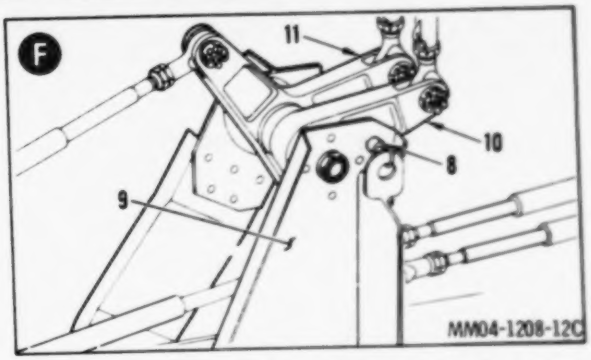
4-8-33. NO. 2 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-33

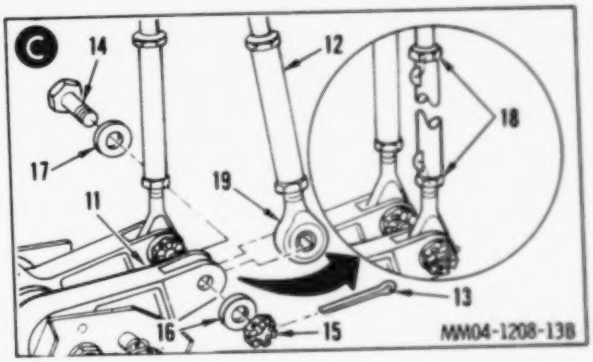

B
C
D
E
F
MM04-1208-5D


G
MM04-1208-6D

GO TO NEXT PAGE

4-8-33. NO. 2 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-33





6. **Insert rig pin (8) fully into bracket (9) and bellcranks (10) and (11).** Use -3 rig pin.

NOTE

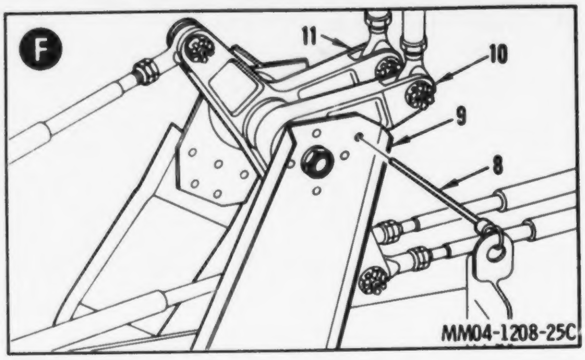
If bellcrank does not aline, go to step 7. If bellcrank does aline, proceed to step 20.

7. **Adjust No. 2 power quadrant control rod (12) to aline with bellcrank (11).**
   - a. Remove and discard cotter pin (13).
   - b. Hold bolt (14).
   - c. Remove nut (15) and washer (16).
   - d. Remove bolt (14) and washer (17) from bellcrank (11) and control rod (12).
   - e. Remove lockwire from control rod (12).
   - f. Loosen two jam nuts (18) at ends of control rod (12).
   - g. Adjust length of control rod (12) as needed. Aline control rod end (19) with bellcrank (11).
8. **Connect No. 2 power quadrant control rod (12) to bellcrank (11).**
   - a. Insert bolt (14) with washer (17) through bellcrank (11) and rod end (19).
   - b. Hold bolt (14).
   - c. Install washer (16) and nut (15) on bolt (14).
9. **Torque nut (15) to 14 TO 18 INCH-POUNDS.** Use 1/4 drive torque wrench (0 to 30 INCH-POUNDS).
   - a. Hold bolt (14) and torque nut (15) to **14 INCH-POUNDS.**
   - b. Increase torque to aline cotter pin holes, but do not exceed **18-INCH POUNDS.**
   - c. Install new cotter pin (13).
10. **Torque two nuts (18) to 20 INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 INCH-POUNDS). Lockwire two nuts (18). Use lockwire (E29).

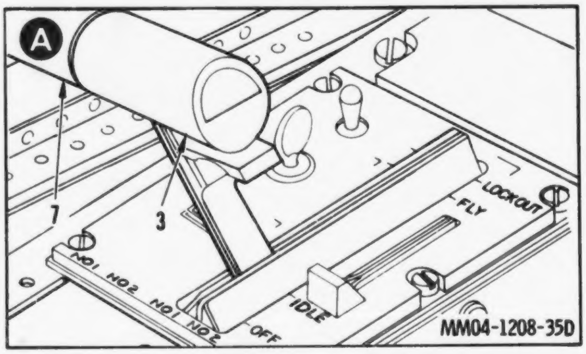
GO TO NEXT PAGE

4-8-33. NO. 2 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-33

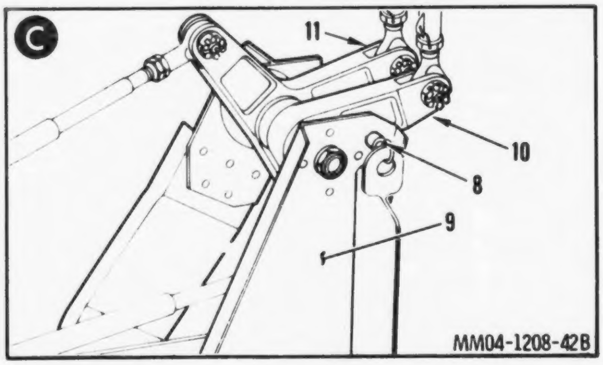
11. Remove rig pin (8) from bracket (9) and bellcranks (10) and (11).


F
11
10
9
8
MM04-1208-25C

12. Move power levers No. 2 (3) and No. 1 (7) to OFF, IDLE, FLY, LOCKOUT, and back to IDLE.


A
7
3
LOCKOUT
FLY
IDLE
OFF
NO1 NO2 NO1 NO2
MM04-1208-35D

13. Insert rig pin (8) fully into bracket (9) and bellcranks (10) and (11). Use -3 rig pin.


C
11
10
8
9
MM04-1208-42B

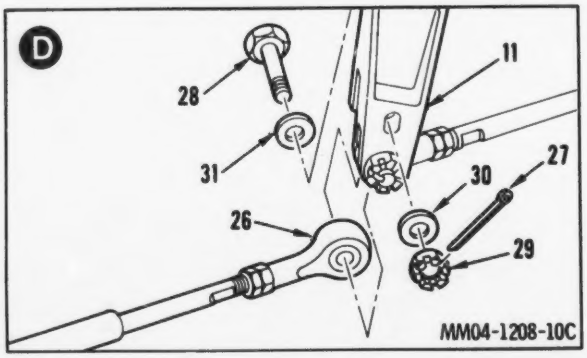
14. Disconnect cable rod end (26) from bellcrank (11).

    a. Remove and discard cotter pin (27).

    b. Hold bolt (28).

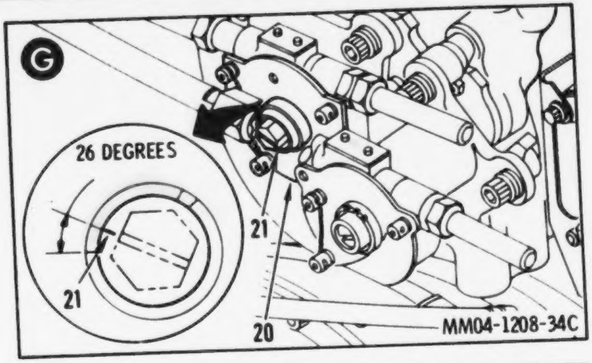
    c. Remove nut (29) and washer (30).

    d. Remove bolt (28) and washer (31).


D
28
11
31
27
30
26
29
MM04-1208-10C

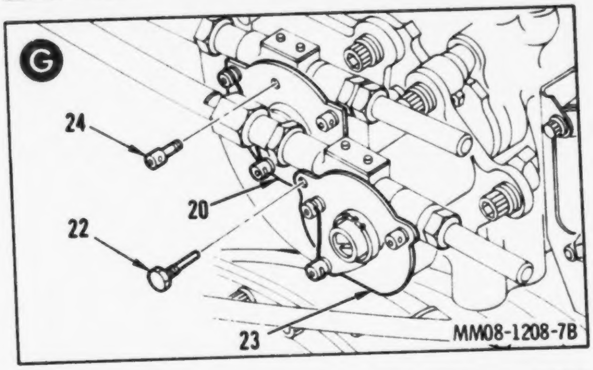
GO TO NEXT PAGE

15. **At PAS gearbox (20), verify pinion shaft (21) is at 26 DEGREE position.**


G
26 DEGREES
21
21
20
MM04-1208-34C

16. **Remove rig pin (22) from load demand spindle (LDS) gearbox (23).** Remove lockwire and remove rig pin (22).

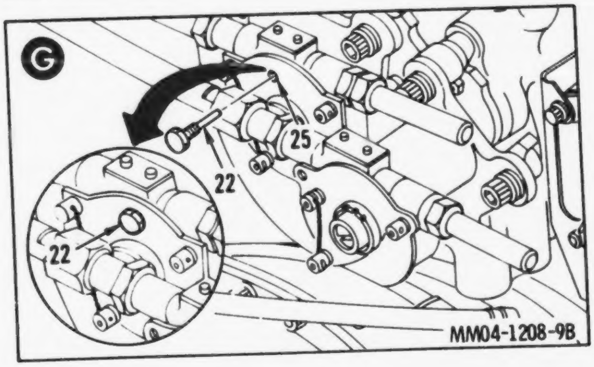
17. **Remove capscrew (24) from PAS gearbox (20).** Remove lockwire.


G
24
20
22
23
MM08-1208-7B

18. **Insert rig pin (22) in rig pin hole (25).**

NOTE

Rig pin must bottom and lock gearbox pinion in position. If rig pin bottoms and locks, proceed to step 31. If rig pin does not bottom and lock, proceed to step 19.


G
25
22
22
MM04-1208-9B

GO TO NEXT PAGE

4-8-33. NO. 2 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-33

19. **Adjust cable (32).**

    a. If rod end (26) requires forward movement, hold cable slots (33) and loosen nut (34). Tighten nut (35) to aline rod end (26) with bellcrank (11).

    b. If rod end (26) requires aft movement, hold cable slots (33) and loosen nut (35). Tighten nut (34) to aline rod end (26) to bellcrank (11).

20. **Connect cable rod end (26) to bellcrank (11).**

    a. Position rod end (26) in bellcrank (11).

    b. Install bolt (28) with washer (31) through bellcrank (11) and rod end (26).

    c. Hold bolt (28).

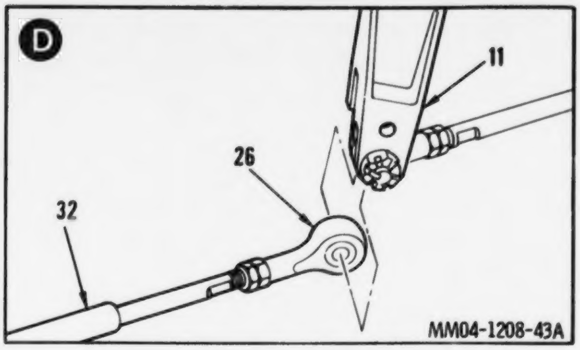
    d. Install washer (30) and nut (29) on bolt (28).

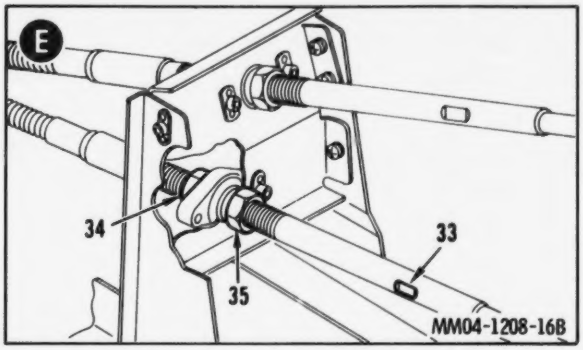
21. **Torque nut (29) 14 to 18 INCH-POUNDS.** Use 1/4 drive torque wrench (0 to 30 INCH-POUNDS).

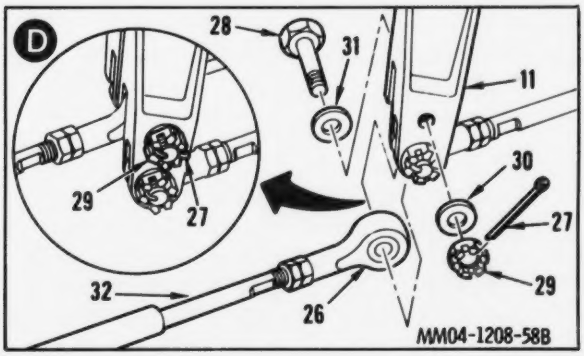
    a. Hold bolt (28) and torque nut (29) to **14 INCH-POUNDS.**

    b. Increase torque to aline cotter pin holes, but do not exceed **18 INCH-POUNDS.**

    c. Install new cotter pin (27).







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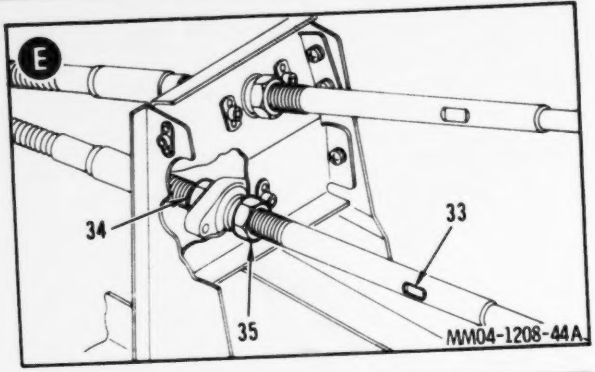
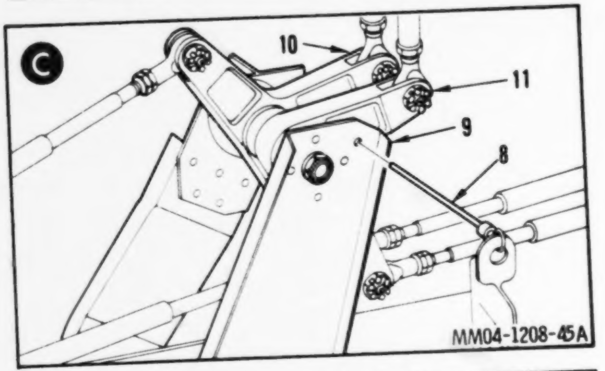
4-8-33. NO. 2 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont)

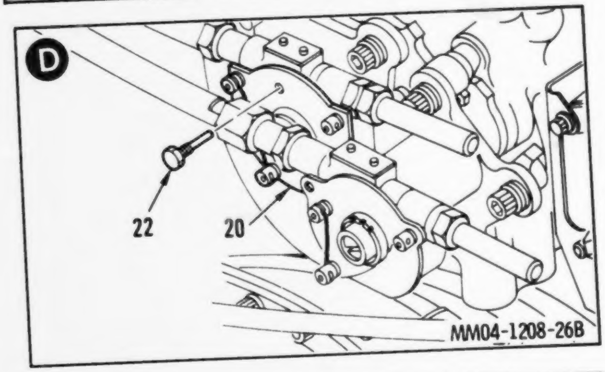
22. **Torque two nuts (34) and (35) to 90 INCH-POUNDS.** Hold cable slots (33). Use 1/4 drive torque wrench (30 to 150 INCH-POUNDS).


E
34
33
35
MM04-1208-44A

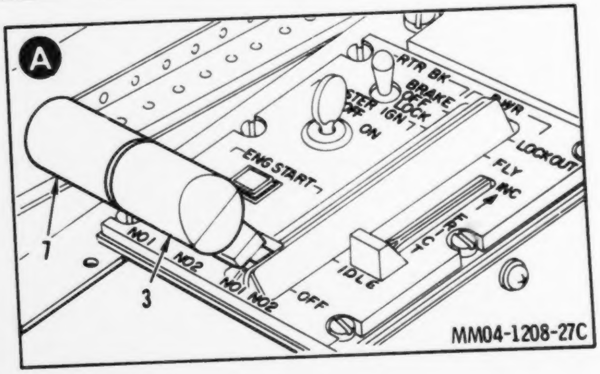
23. **In pilot station, remove rig pin (8) from bracket (9) and bellcranks (11) and (10).**


C
10
11
9
8
MM04-1208-45A

24. **Remove rig pin (22) from PAS gearbox (20).**


D
22
20
MM04-1208-26B

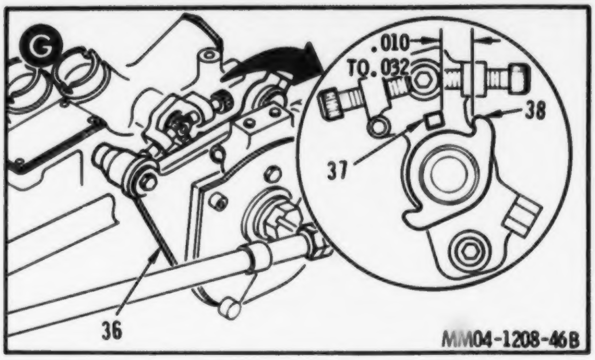
25. **Move pilot power levers No. 2 (3) and No. 1 (7) to OFF.**


A
RTR BK
BRAKE
OFF
LOCK
STER IGN
OFF
ON
PWR
ENG START
LOCKOUT
FLY
INC
IDLE
NO1
NO2
NO1
NO2
OFF
7
3
MM04-1208-27C

GO TO NEXT PAGE

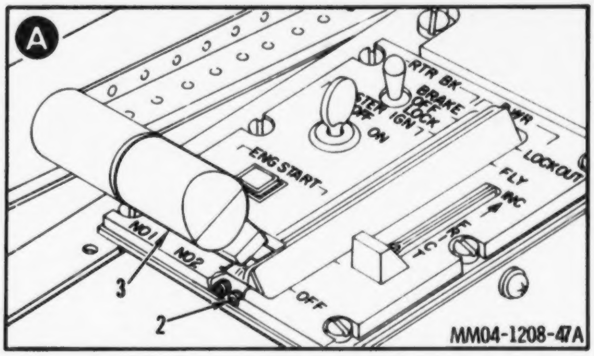
4-8-33. NO. 2 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-33

26. **At hydromechanical unit (HMU) spindle gearbox (36), obtain 0.010 to 0.032-INCH gap between spindle stop(37) and spindle cam (38).**

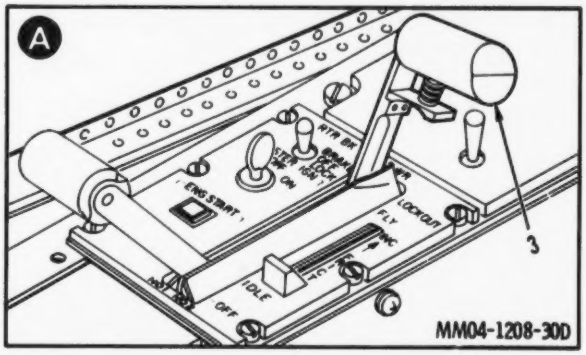

G
.010
TO .032
38
37
36
MM04-1208-46B

27. **Adjust pilot No. 2 power lever (3) OFF stop screw (2).**

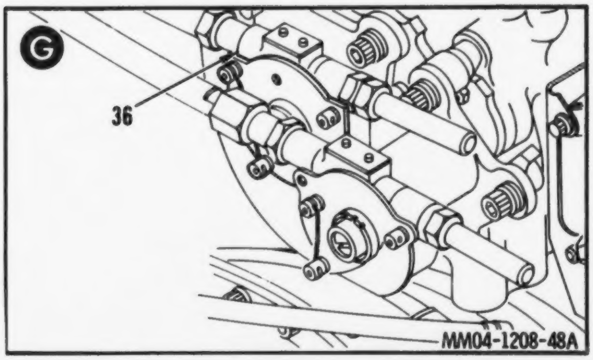
    Adjust screw (2) until it touches power lever (3) with lever in OFF position.


A
RTR BK
BRAKE
OFF
LOCK
STER
IGN
ON
ENG START
PWR
LOCKOUT
FLY
INC
NO1
NO2
OFF
3
2
MM04-1208-47A

28. **Move pilot No. 2 power lever (3) to LOCKOUT.**


A
RTR BK
BRAKE
ENG START
LOCKOUT
FLY
INC
IDLE
OFF
3
MM04-1208-30D

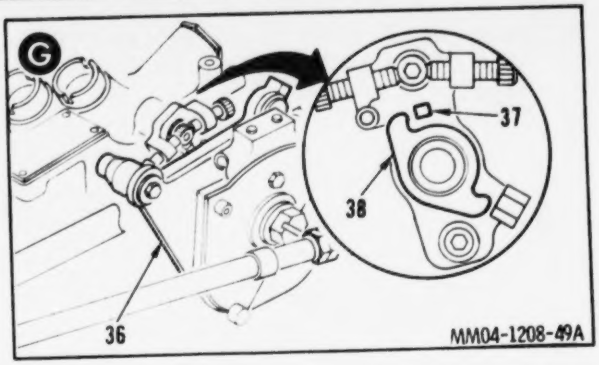
29. **Verify audible click from HMU (36).**


G
36
MM04-1208-48A

GO TO NEXT PAGE

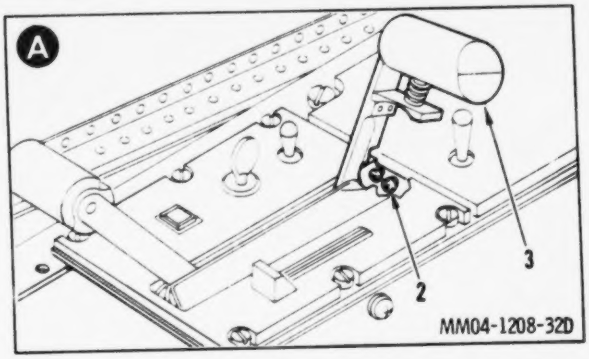
4-8-33. NO. 2 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-33

30. **At HMU (36), verify that spindle cam (38) does not contact spindle stop (37).**

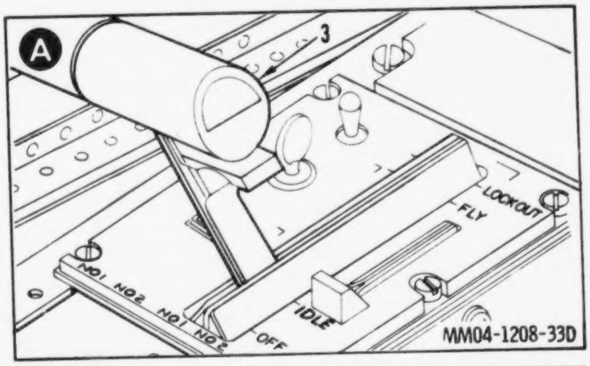

G
37
38
36
MM04-1208-49A

31. **Adjust pilot No. 2 power lever (3) maximum screw (2) stop.**

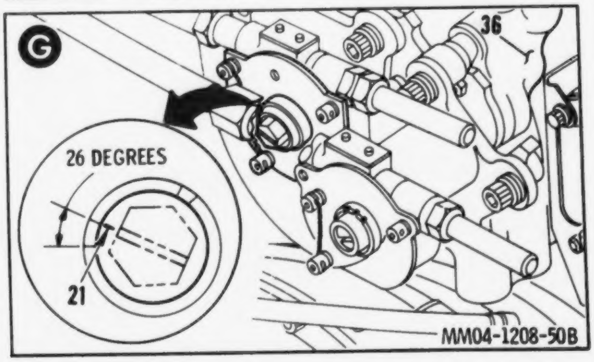
    With power lever (3) in LOCKOUT, adjust screw (2) until it touches power lever (3).


A
3
2
MM04-1208-32D

32. **Move pilot No. 2 power lever (3) to IDLE.**


A
3
LOCKOUT
FLY
NO1 NO2 NO1 NO2
IDLE
OFF
MM04-1208-33D

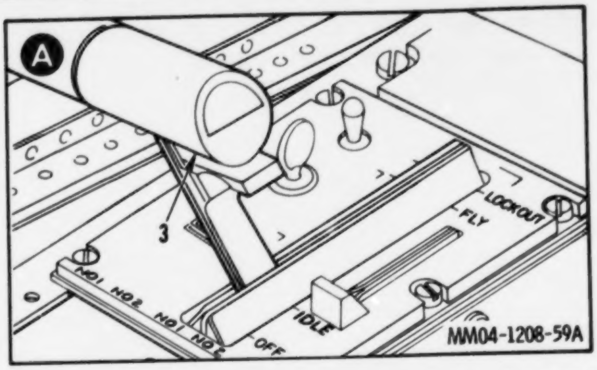
33. **Verify audible click from HMU (36) and that PAS gearbox pinion shaft (21) is in 26-DEGREE (IDLE) position.**


G
36
26 DEGREES
21
MM04-1208-50B

GO TO NEXT PAGE

4-8-33. NO. 2 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-33

34. **Move No. 2 power lever (3) to OFF, IDLE, FLY, LOCKOUT, and back to IDLE.**

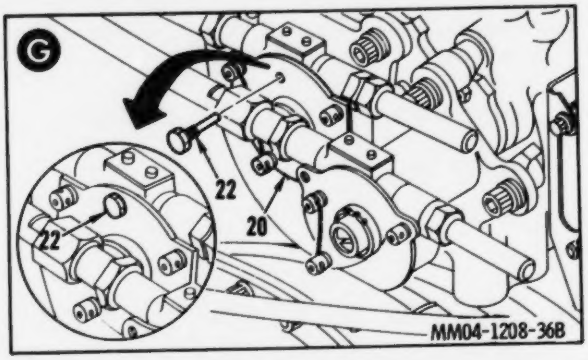

A
3
LOCKOUT
FLY
IDLE
OFF
NO1 NO2 NO1 NO2
MM04-1208-59A

NOTE

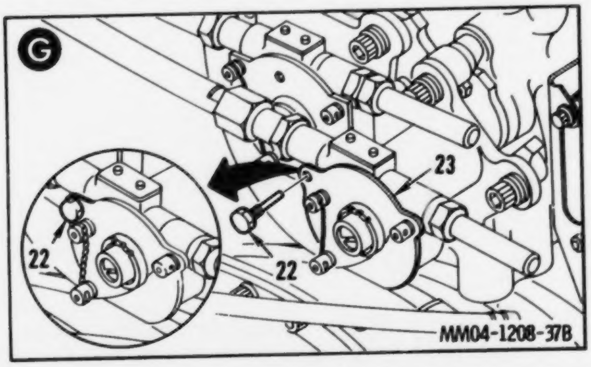
If rig pin cannot be installed, repeat steps 6 thru 43.

35. **Insert rig pin (22) in PAS gearbox (20).**

36. **Remove rig pin (22) from PAS gearbox (20).**


G
22
20
22
MM04-1208-36B

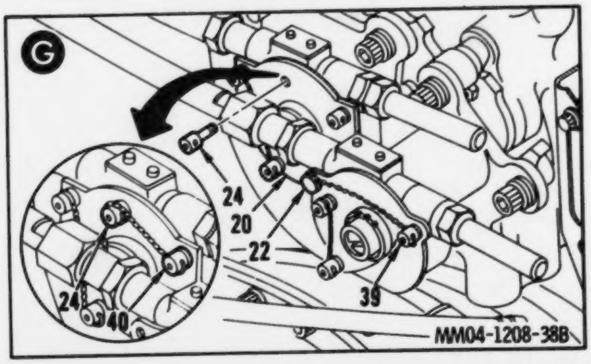
37. **Stow rig pin (22) in LDS gearbox (23).**


G
23
22
22
MM04-1208-37B

38. **Install capscrew (24) in PAS gearbox (20).**

39. **Lockwire rig pin (22) to capscrew (39).** Use lockwire (E29).

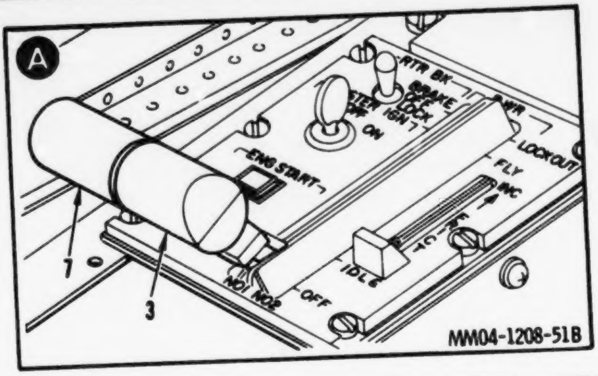
40. **Lockwire capscrew (24) to capscrew (40).** Use lockwire (E29).


G
24
20
22
39
24
40
MM04-1208-38B

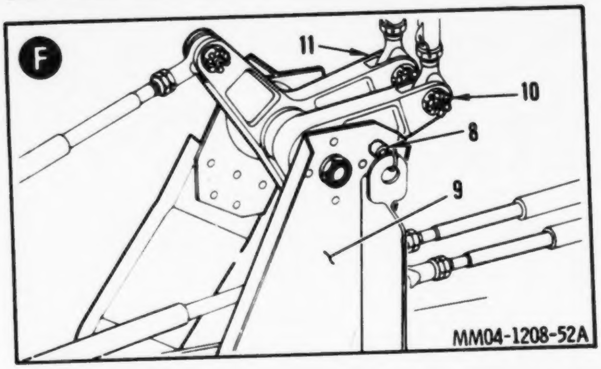
GO TO NEXT PAGE

4-8-33. NO. 2 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-33

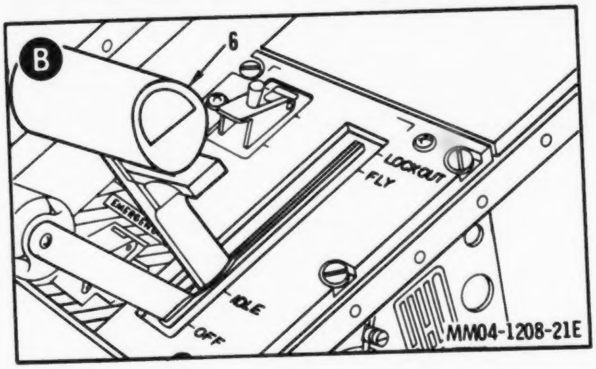
41. Move pilot power levers No. 2 (3) and No. 1 (7) to OFF.


A
RTR BK
BRAKE
OFF
LOCK
STEN IGN
OFF ON
PWR
ENG START
LOCKOUT
FLY
INC
IDLE
OFF
NO1 NO2
7
3
MM04-1208-51B

42. At pilot station, insert rig pin (8) into bracket (9) and bellcranks (10) and (11).


F
11
10
8
9
MM04-1208-52A

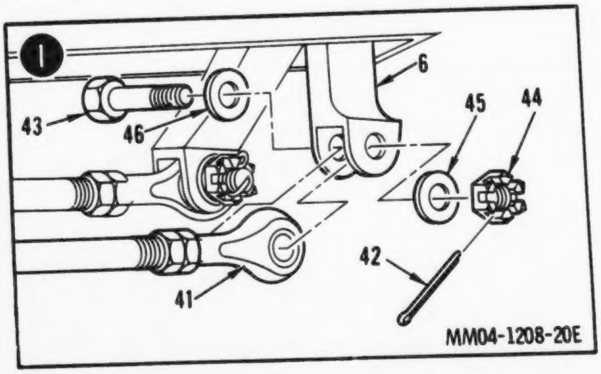
43. Verify No. 2 CPG power lever (6) is in IDLE.


B
6
LOCKOUT
FLY
IDLE
OFF
MM04-1208-21E

NOTE

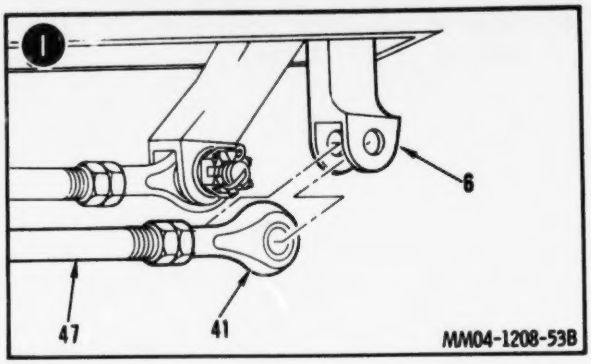
If power lever alines with IDLE position, proceed to step 57.

44. Disconnect cable rod end (41) from CPG No. 2 power lever (6).
    a. Remove and discard cotter pin (42).
    b. Hold bolt (43).
    c. Remove nut (44) and washer (45).
    d. Remove bolt (43) and washer (46) from power lever (6) and rod end (41).


I
6
43
46
45
44
42
41
MM04-1208-20E

GO TO NEXT PAGE

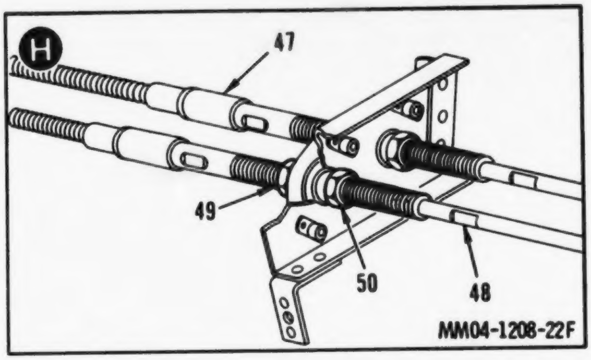
4-8-33. NO. 2 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont) 4-8-33



45. **Adjust cable (47).**

   a. If rod end (41) requires forward movement, hold cable slots (48) and loosen nut (49). Tighten nut (50) to aline rod end (41) with power lever (6).

   b. If rod end (41) requires aft movement, hold cable slots (48) and loosen nut (50). Tighten nut (49) to aline rod end (41) with power lever (6).



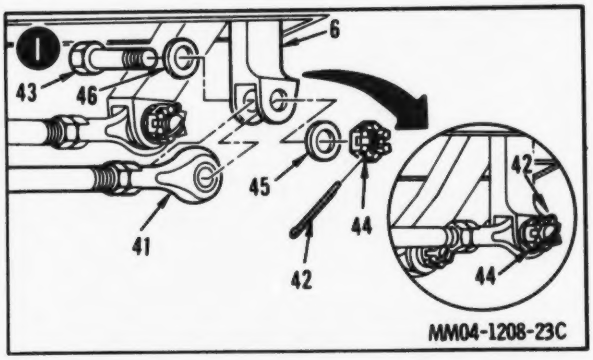
46. **Connect cable rod end (41) to CPG power lever (6).**

   a. Position rod end (41) in power lever (6).

   b. Insert bolt (43) with washer (46) through power lever (6) and rod end (41).

   c. Hold bolt (43).

   d. Install washer (45) and nut (45) on bolt (43).



47. **Torque nut (44) 14 to 18 INCH-POUNDS.** Use 1/4 drive torque wrench (0 to 30 INCH-POUNDS).

   a. Hold bolt (43) and torque nut (44) to **14 INCH-POUNDS.**

   b. Increase torque to aline cotter pin holes, but do not exceed **18 INCH-POUNDS.**

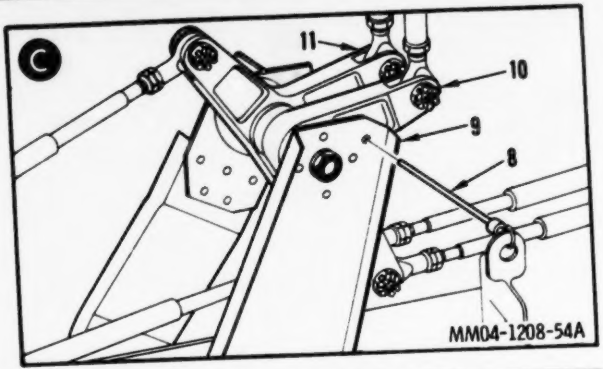
   c. Install new cotter pin (42).

48. **Torque two nuts (49) and (50) to 90 INCH-POUNDS.** Use 1/4 drive torque wrench (30 to 150 INCH-POUNDS). Hold cable slots (48).

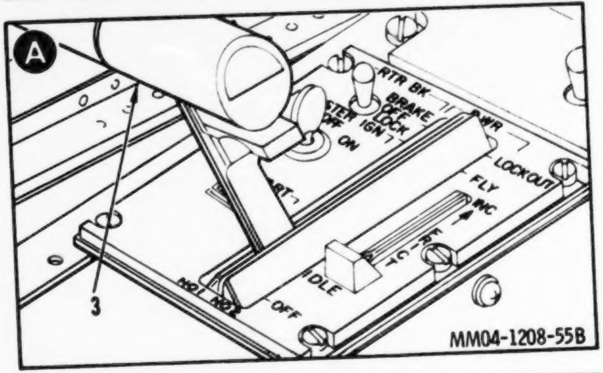
GO TO NEXT PAGE

4-8-33. NO. 2 ENGINE POWER AVAILABLE SPINDLE (PAS) RIGGING (cont)

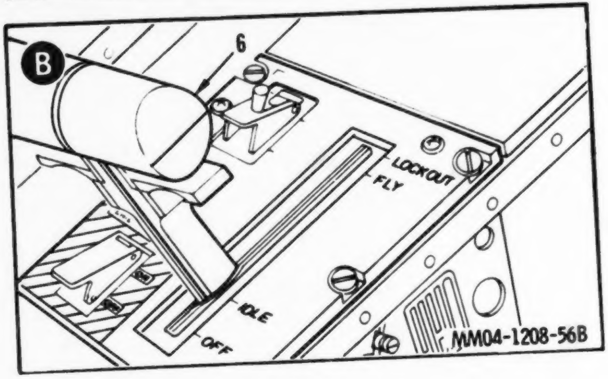
54. In pilot station, remove rig pin (8) from bracket (9) and bellcranks (10) and (11).


C
11
10
9
8
MM04-1208-54A

55. Move pilot power lever NO. 2 (3) to OFF, IDLE, FLY, LOCKOUT, and back to IDLE.


A
RTR BK
BRAKE
OFF
LOCK
PWR
STEM IGN
OFF
ON
LOCKOUT
FLY
INC
IDLE
OFF
NO1
NO2
3
MM04-1208-55B

56. Verify CPG power lever (6) movement to OFF, IDLE, FLY, LOCKOUT and back to IDLE occurs when pilot No. 2 power lever (3) is moved.


B
6
LOCKOUT
FLY
IDLE
OFF
MM04-1208-56B

57. Inspect (TI).

58. Install CPG fuel control panel (para 10-2-95).

59. Install CPG INTR LTS panel (para 9-6-10).

60. Install pilot fuel control panel (para 10-2-96).

61. Install pilot INTR LTS, EXT LTS panel (para 9-6-9).

62. Perform power plant operational check (engine No. 2) (TM 55-1520-238-T).

GO TO NEXT PAGE

63. Install pilot left consoles PL1 and PL3 (para 2-2-2).

64. Install CPG left consoles CL1 and CL3 (para 2-2-2).

65. Install No. 2 engine shroud (para 4-2-9).

66. Secure access door RN1 (para 2-2-2).

END OF TASK

4-8-34. NO. 1 AND NO. 2 ENGINE LOAD DEMAND SPINDLE RIGGING CHECK 4-8-34

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Rigging Kit, Control Systems	1730-01-181-9270
Aviation Ground Power Unit (AGPU)	1730-01-144-1897

Materials/Parts:

(E29) Lockwire

Personnel Required:

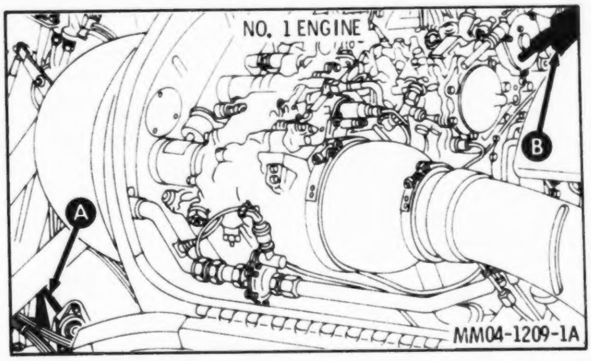
67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

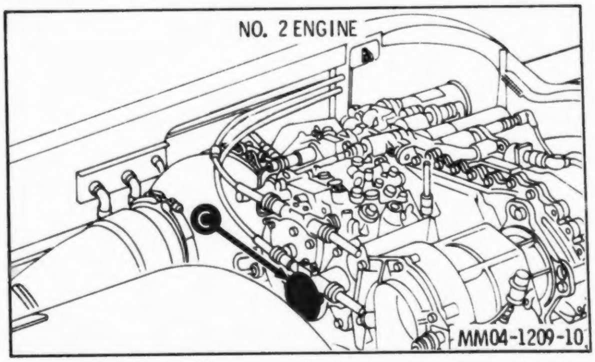
References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access doors LN1 and LN2 opened and Panel L200 removed

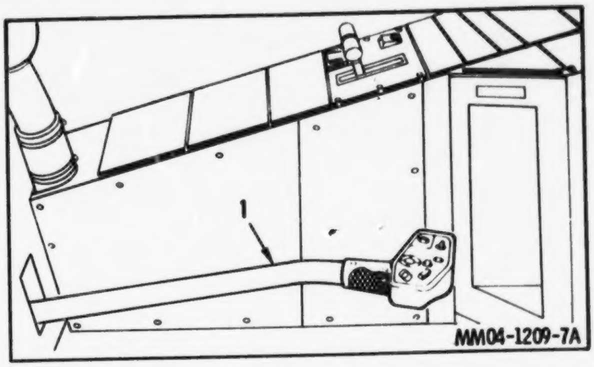


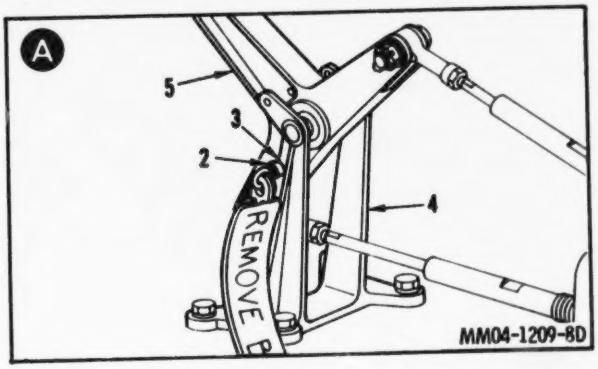


GO TO NEXT PAGE

4-8-34. NO. 1 AND NO. 2 ENGINE LOAD DEMAND SPINDLE RIGGING CHECK (cont) 4-8-34

1. Connect AGPU (para 1-7-16 and 1-7-18). Observe all safety precautions.
2. Enter pilot station (para 1-7-1). Observe all safety precautions.
3. Move pilot collective stick (1) through full up and full down.
4. Move pilot collective stick (1) to full down position.
5. Disconnect AGPU (para 1-7-16 and 1-7-18).





6. Install -7 rig pin (2) in upper rig pin hole (3) of bracket (4) and bellcrank (5). If rig pin cannot be inserted, collective control system is out of rig (para 4-8-36).

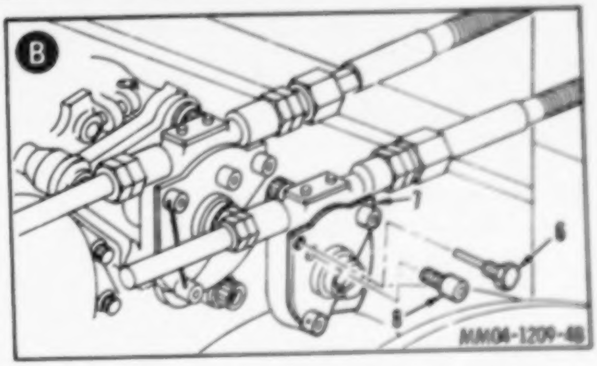
GO TO NEXT PAGE

4-8-34. NO. 1 AND NO. 2 ENGINE LOAD DEMAND SPINDLE RIGGING CHECK (cont) 4-8-34

7. **Remove rig pin (6) from load demand spindle gearbox (7).**

   a. Remove lockwire from rig pin (6) and capscrew (8).

   b. Remove rig pin (6) and cap screw (8) from gearbox (7).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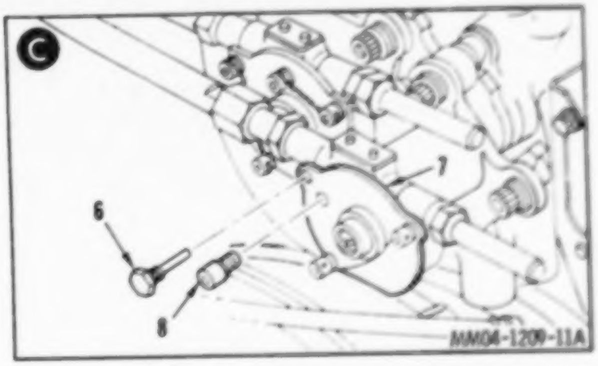
MM04-1209-4B


C
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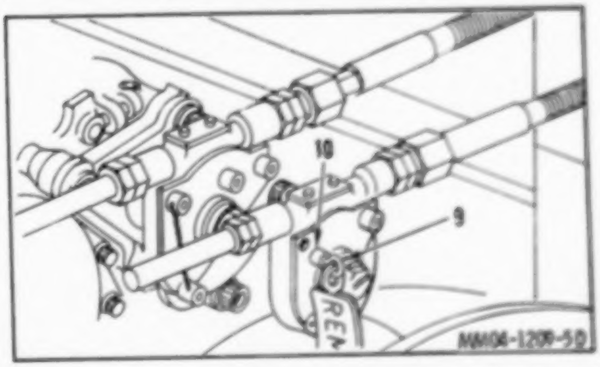
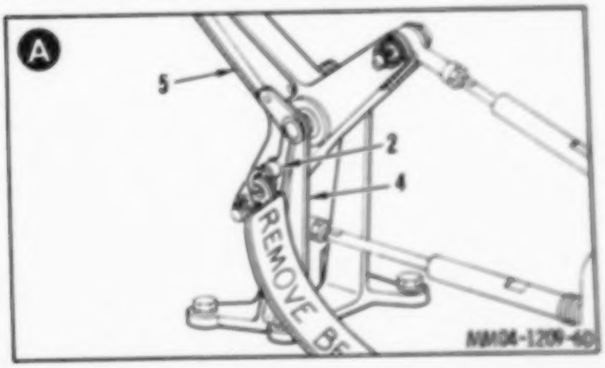
MM04-1209-11A

10. **Insert -13 rig pin (9) in capscrew hole (10). If rig pin cannot be inserted, system is out of rig.** (para 4-8-35)


10
9
REA
MM04-1209-5D

11. **Remove -13 rig pin (9).**

12. **Remove -7 rig pin (2) from bracket (4) and bellcrank (5).**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REMOVE BE
MM04-1209-6D

GO TO NEXT PAGE

4-8-34. NO. 1 AND NO. 2 ENGINE LOAD DEMAND SPINDLE RIGGING CHECK (cont) 4-8-34

13. **Install rig pin (6) in load demand spindle gearbox (7).**

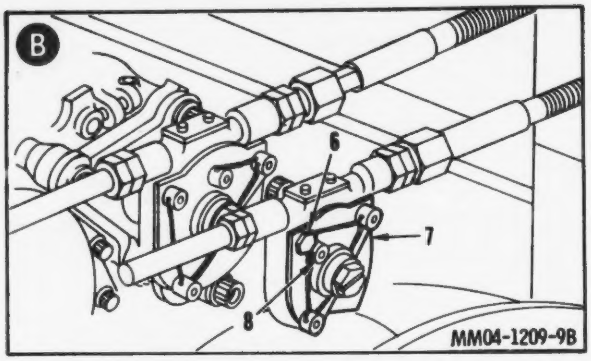
14. **Install capscrew (8) in load demand spindle gearbox (7).**

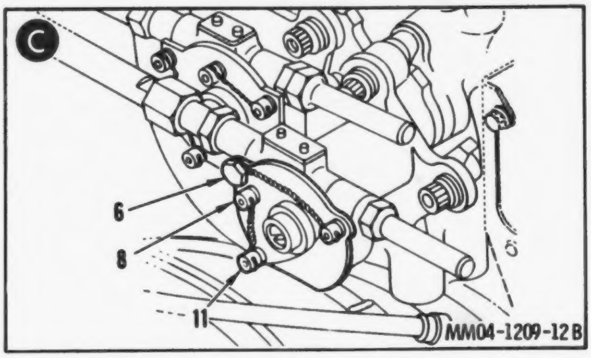
15. **Lockwire rig pin (6) to capscrew (10).** Use lockwire (E29).

16. **Inspect (TI).** Lockwire capscrew (8) to capscrew (11). Use lockwire (E29).

17. **Secure access doors LN1, LN2 and access panel L200** (para 2-2-2).

18. **Perform power plant operational check (engine 1 and engine 2)** (TM 55-1520-238-T).





END OF TASK

4-8-35. NO. 1 AND NO. 2 ENGINE LOAD DEMAND SPINDLE RIGGING 4-8-35

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-117-4832
Rigging Kit, Control Systems	1730-01-181-9270
Aviation Ground Power Unit (AGPU)	1730-01-144-1897

Materials/Parts:

Cotter Pin (3)
(E29) Lockwire

Personnel Required:

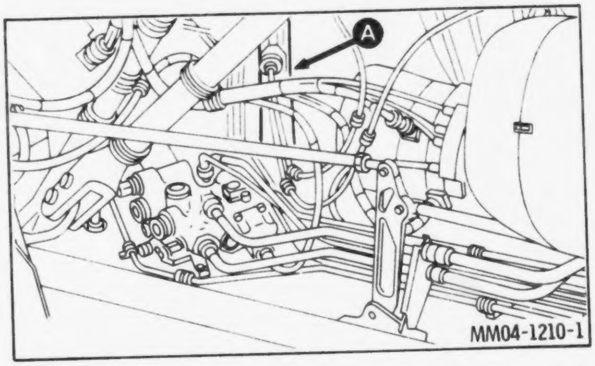
67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

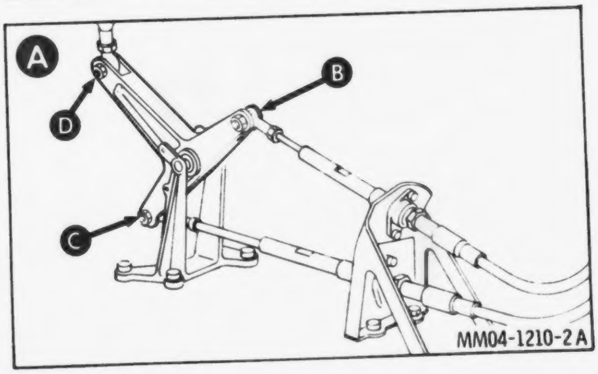
References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Conditions
1-7-2	Helicopter safted
2-2-2	Engine work platform doors LN1, LN2 opened, and panel L200 removed





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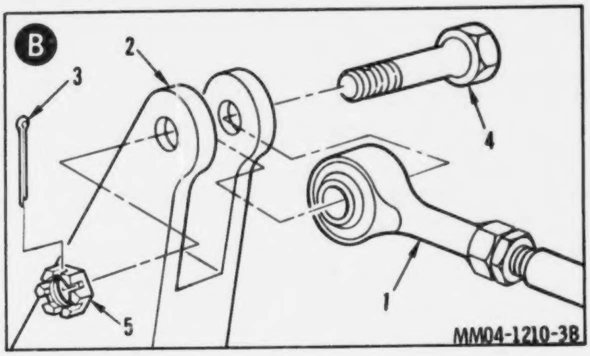
4-8-35. NO. 1 AND NO. 2 ENGINE LOAD DEMAND SPINDLE RIGGING (cont) 4-8-35


B
2
3
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1
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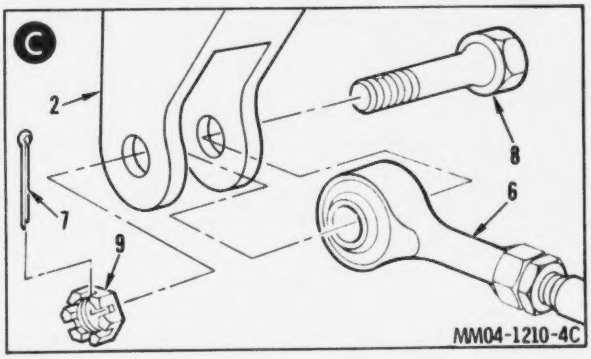
MM04-1210-3B

1. **Disconnect rod end (1) from bellcrank (2).**
   - a. Remove and discard cotter pin (3).
   - b. Hold bolt (4).
   - c. Remove nut (5).
   - d. Remove bolt (4) from bellcrank (2) and rod end (1).


C
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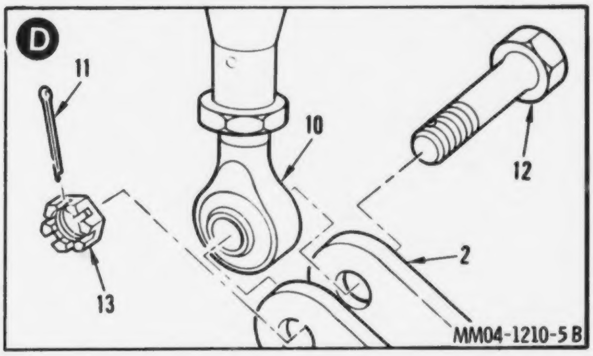
MM04-1210-4C

2. **Disconnect rod end (6) from bellcrank (2).**
   - a. Remove and discard cotter pin (7).
   - b. Hold bolt (8).
   - c. Remove nut (9).
   - d. Remove bolt (8) from bellcrank (2) and rod end (6).

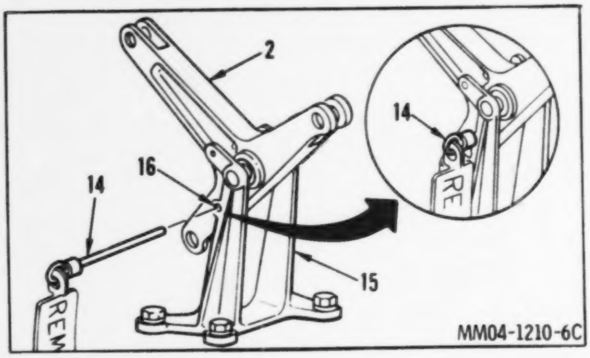

D
11
10
12
2
13
MM04-1210-5 B

3. **Disconnect rod end (10) from bellcrank (2).**
   - a. Remove and discard cotter pin (11).
   - b. Hold bolt (12).
   - c. Remove nut (13).
   - d. Remove bolt (12) from bellcrank (2) and rod end (10).

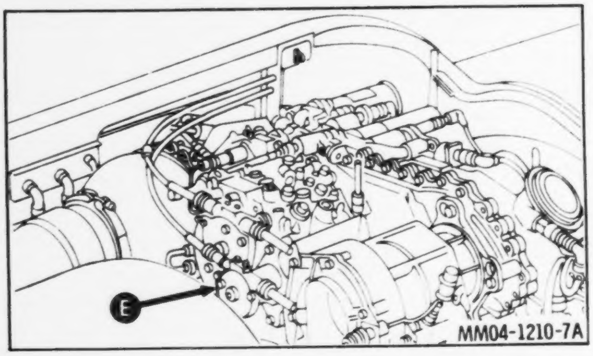
GO TO NEXT PAGE

4-8-35. NO. 1 AND NO. 2 ENGINE LOAD DEMAND SPINDLE RIGGING (cont) 4-8-35

4. **Insert -7 rig pin (14) into bracket (15) and bellcrank (2) at bottom rig pin hole (16).**



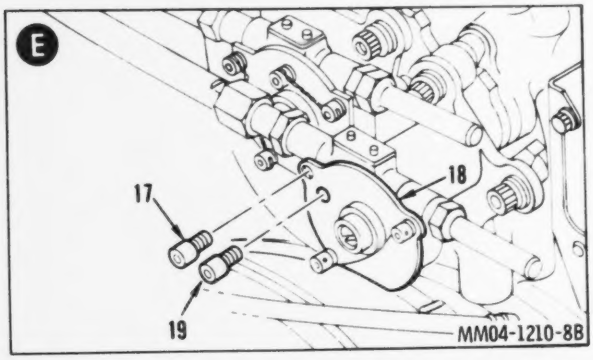
MM04-1210-6C



MM04-1210-7A

5. **Remove capscrew (17) from No. 2 engine gearbox (18).** Remove lockwire and capscrew (17).

6. **Remove capscrew (19) from No. 2 engine gearbox (18).** Remove lockwire and capscrew (19).



MM04-1210-8B

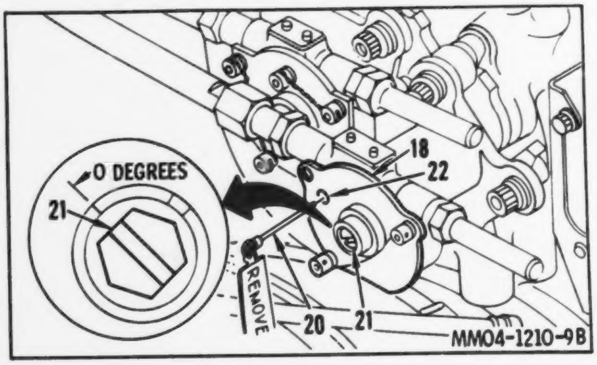
NOTE

-13 rig pin must bottom and lock gearbox at ZERO-DEGREE position.

7. **Insert -13 rig pin (20) into No. 2 engine gearbox (18) at ZERO-DEGREE position.**

   a. Rotate gearbox shaft (21), as required, to aline rig pin hole (22).

   b. Insert -13 rig pin (20) in rig pin hole (22).



MM04-1210-9B

GO TO NEXT PAGE

4-8-35. NO. 1 AND NO 2. ENGINE LOAD DEMAND SPINDLE RIGGING (cont) 4-8-35

8. **Remove capscrew (23) from No. 1 engine LDS gearbox (24).** Remove lockwire. Remove capscrew (23).

9. **Remove capscrew (25) from No. 1 engine LDS gearbox (24).** Remove lockwire. Remove capscrew (25).

NOTE

-13 rig pin must bottom and lock gearbox at ZERO-DEGREE position.

10. **Insert -13 rig pin (26) into No. 1 engine LDS gearbox (24) at ZERO-DEGREE position.**

    a. Turn gearbox shaft (27), as required, to aline rig pin hole (28).

    b. Insert -13 rig pin (26) in rig pin hole (28).

11. **Connect rod end (1) to bellcrank (2).**

    a. Hold cable (29) on wrench flats (30).

    b. Loosen nuts (31) and (32).

    c. Insert bolt (4) into bellcrank (2) and rod end (1).

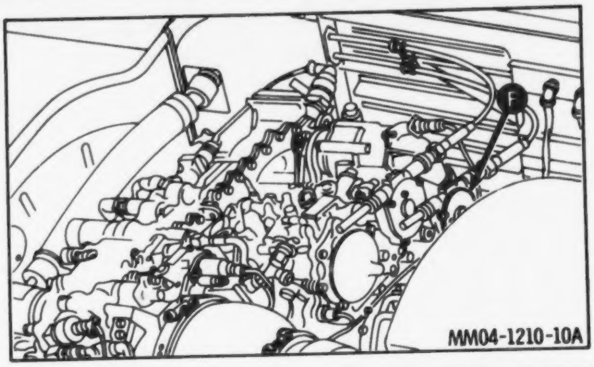
    d. Install nut (5) on bolt (4).

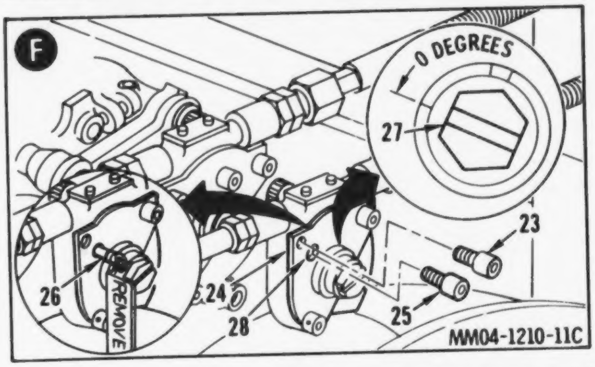
12. **Torque nut (5) 14 to 18 INCH-POUNDS and install new cotter pin (3).**

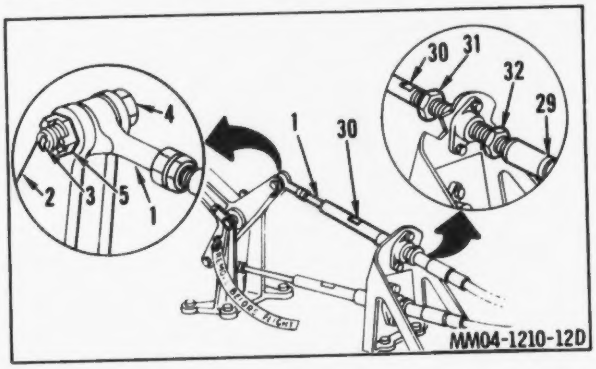
    a. Hold bolt (4). Torque nut (5) to **14 INCH-POUNDS.**

    b. Increase torque to aline cotter pin holes, but do not exceed **18 INCH-POUNDS.**

    c. Install new cotter pin (3).







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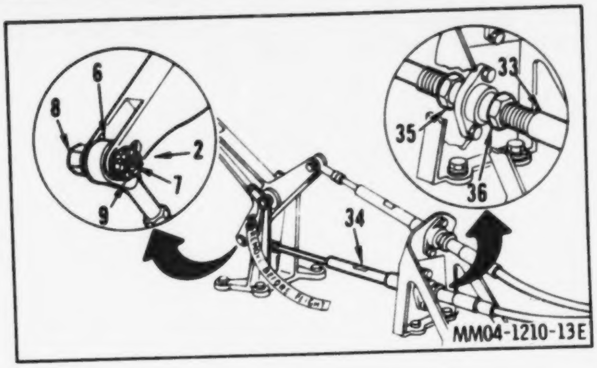
4-8-35. NO. 1 AND NO. 2 ENGINE LOAD DEMAND SPINDLE RIGGING (cont)



13. **Connect rod end (6) to bellcrank (2).**

    a. Hold cable (33) on wrench flats (34).

    b. Loosen nuts (35) and (36).

    c. Insert bolt (8) into bellcrank (2) and rod end (6).

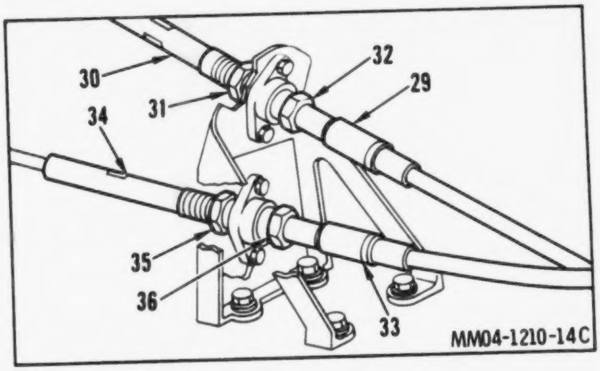
    d. Install nut (9) on bolt (8).

14. **Torque nut (9) to 14 to 18 INCH-POUNDS and install new cotter pin (7).**

    a. Hold bolt (8). Torque nut (9) to **14 INCH-POUNDS.**

    b. Increase torque to aline cotter pin holes but do not exceed **18 INCH-POUNDS.**

    c. Install new cotter pin (7).



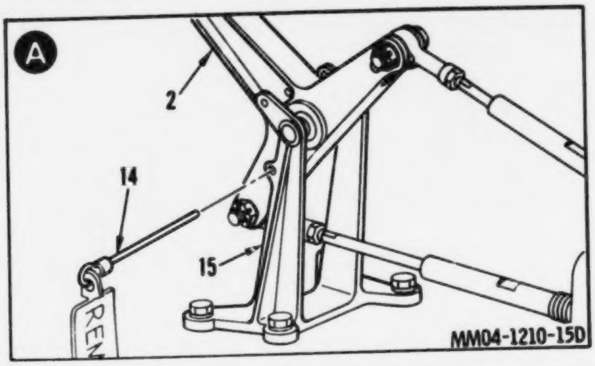
15. **Torque nuts (31) and (32) to 90 INCH-POUNDS.** Hold cable (29) on wrench flats (30).

16. **Torque nuts (35) and (36) to 90 INCH-POUNDS.** Hold cable (33) on wrench flats (34).

GO TO NEXT PAGE

4-8-35. NO. 1 AND NO. 2 ENGINE LOAD DEMAND SPINDLE RIGGING (cont) 4-8-35

17. Remove -7 rig pin (14) from bracket (15) and bellcrank (2).


A
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14
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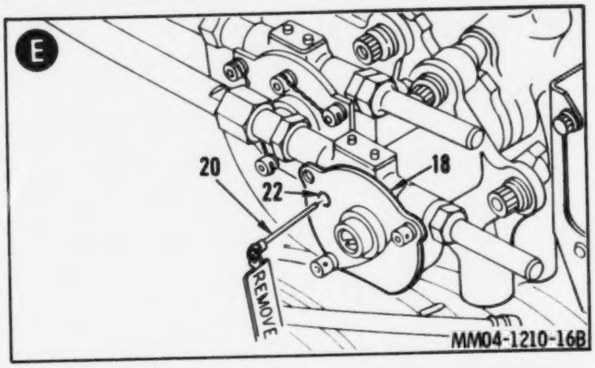
REM
MM04-1210-15D

18. Remove -13 rig pin (20) from No. 2 engine gearbox (18) zero-degree rig pin hole (22).


E
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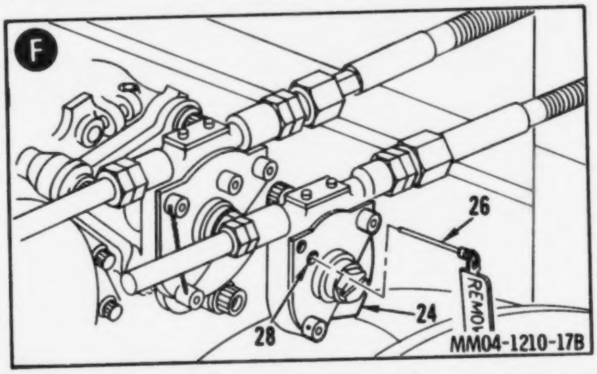
MM04-1210-16B

19. Remove -13 rig pin (26) from No. 1 engine gearbox (24) zero-degree rig pin hole (28).


F
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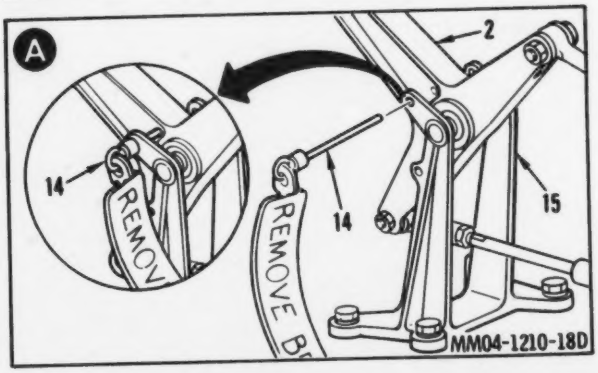
28
REMO
MM04-1210-17B

20. Insert -7 rig pn (14) into top hole of bracket (15) and bellcrank (2).

    a. Push bellcrank (2) down to aline holes.

    b. Insert -7 rig pin (14).

21. Connect aviation ground power unit (AGPU) (para 1-7-16 and 1-7-18). Observe all safety precautions.


A
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15
MM04-1210-18D

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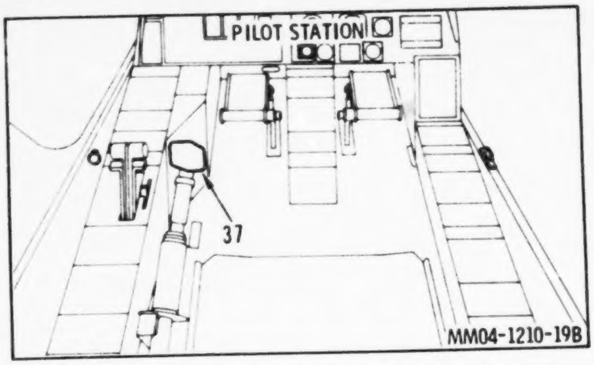
4-8-35. NO. 1 AND NO. 2 ENGINE LOAD DEMAND SPINDLE RIGGING (cont) 4-8-35

22. Apply hydraulic power (para 1-7-19).

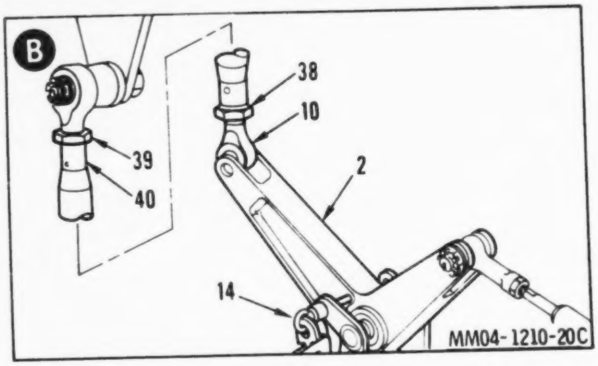
23. Move collective stick (37) to full down position.


PILOT STATION
37
MM04-1210-19B

24. Aline rod end (10) with bellcrank (2).

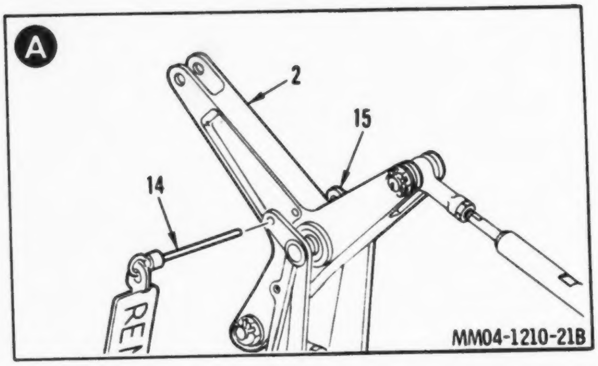
   a. Loosen nuts (38) and (39).

   b. Adjust rod (40) to aline rod end (10) with bellcrank (2), but do not connect.

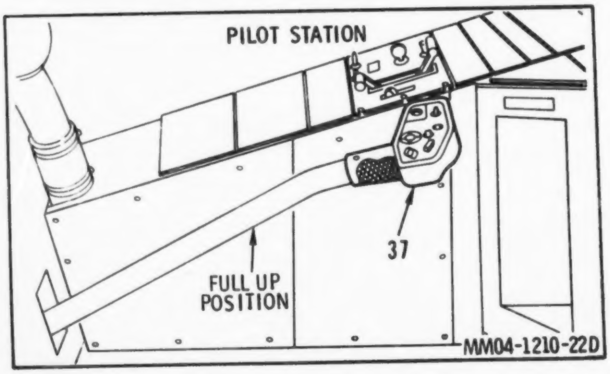

B
38
10
39
40
2
14
MM04-1210-20C

25. Remove -7 rig pin (14) from bracket (15) and bellcrank (2).

26. Check system for smooth operation. Move bellcrank (2) through full range of travel.


A
2
15
14
RE
MM04-1210-21B

27. Move collective stick (37) to full up position.


PILOT STATION
37
FULL UP POSITION
MM04-1210-22D

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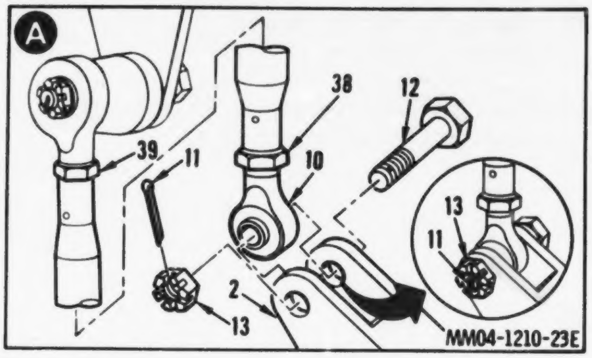
4-8-35. NO. 1 AND NO. 2 ENGINE LOAD DEMAND SPINDLE RIGGING (cont) 4-8-35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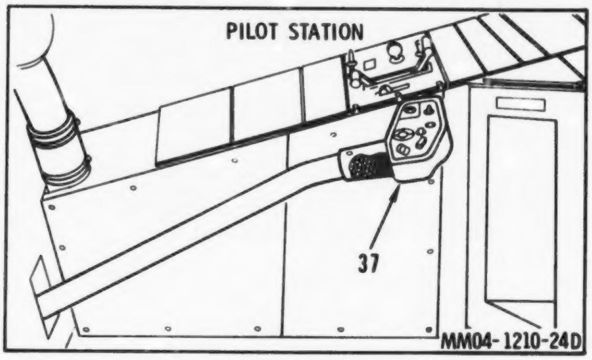
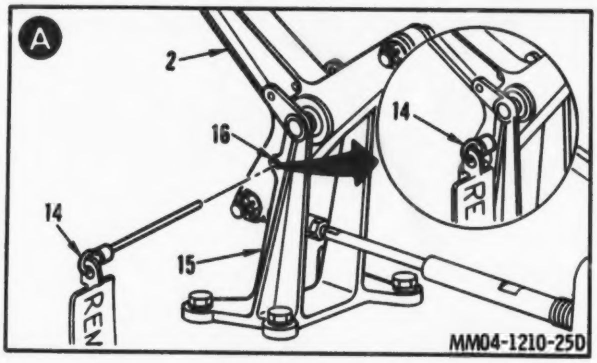
MM04-1210-23E


PILOT STATION
37
MM04-1210-24D


A
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16
14
14
15
RE
REN
MM04-1210-25D

28. **Connect rod end (10) to bellcrank (2).**

    a. Insert bolt (12) into bellcrank (2) and rod end (10).

    b. Install nut (13) on bolt (12).

29. **Torque nut (13) 14 to 18 INCH-POUNDS and install new cotter pin (11).**

    a. Hold bolt (12) and torque nut (13) to **14 INCH-POUNDS.**

    b. Increase torque to aline cotter pin holes but do not exceed **18 INCH-POUNDS.**

    c. Install new cotter pin (11).

30. **Torque nuts (38) and (39) to 20 INCH-POUNDS.**

31. **Move collective stick (37) to full down to full up to full down.**

32. **Lift collective stick (37) slowly until bracket (15) and bottom rig pin holes (16) in bellcrank (2) are alined.**

33. **Insert -7 rig pin (14) into bracket (15) and bellcrank (2) bottom rig pin holes (16).**

NOTE

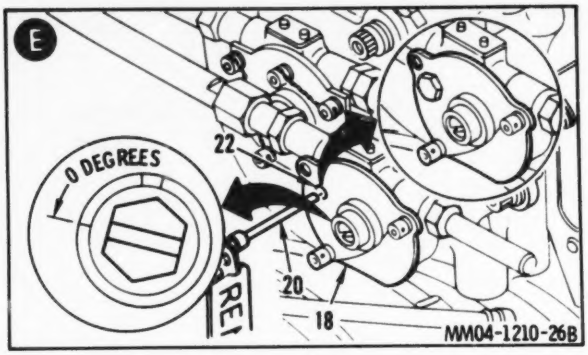
If rig pin (14) cannot be inserted into one or both gearboxes, repeat steps 1 thru 36.

34. **Shut off hydraulic power** (para 1-7-19).

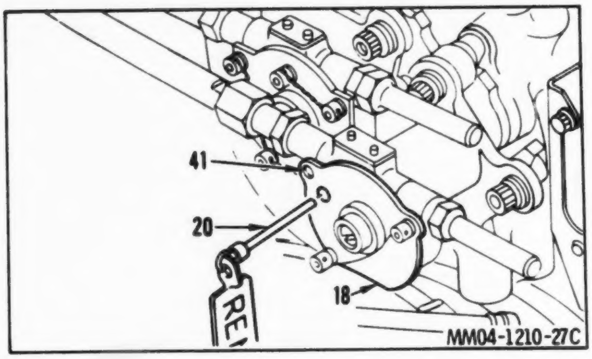
GO TO NEXT PAGE

4-8-35. NO. 1 AND NO. 2 ENGINE LOAD DEMAND SPINDLE RIGGING (cont) 4-8-35

35. **Insert -13 rig pin (20) into No. 2 engine gearbox (18) at ZERO-DEGREE rig pin hole (22).**


E
0 DEGREES
22
20
18
RE
MM04-1210-26B

36. **Stow -13 rig pin (20) in gearbox (18).**
    a. Remove -13 rig pin (20) from gearbox (18) zero-degree rig pin hole (41).
    b. Install capscrew (17) into gearbox (18) rig pin hole (41).


41
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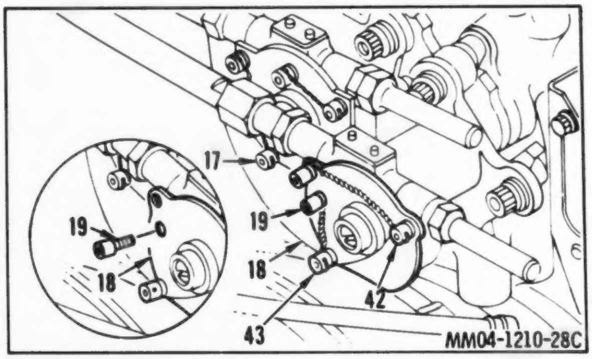
18
RE
MM04-1210-27C

37. **Install capscrew (19) into gearbox (18).**

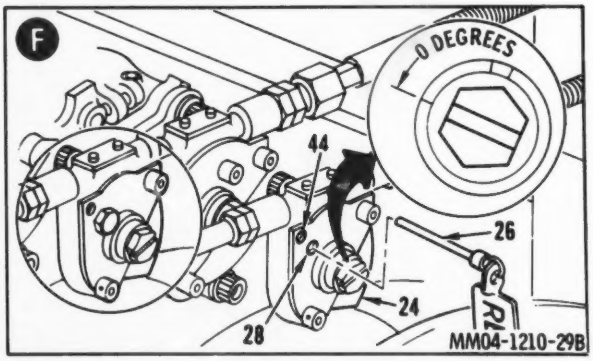
38. **Lockwire capscrew (17) to capscrew (42).** Use lockwire (E29).

39. **Lockwire capscrew (19) to capscrew (43).** Use lockwire (E29).

40. **Insert -13 rig pin (26) into No. 1 engine gearbox (24) at ZERO-DEGREE rig pin hole (28).**


17
19
19
18
18
42
43
MM04-1210-28C

41. **Stow -13 rig pin (26) in gearbox (24) rig pin hole (44).**
    a. Remove -13 rig pin (26) from gearbox (24) zero-degree rig pin hole (28).
    b. Install -13 capscrew (26) in rig pin hole (44).


F
0 DEGREES
44
26
24
28
RE
MM04-1210-29B

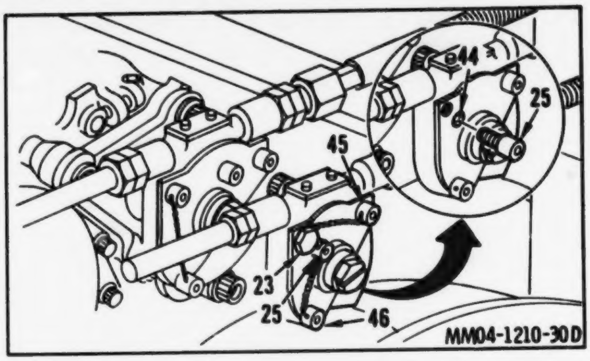
GO TO NEXT PAGE

4-8-35. NO. 1 AND NO. 2 ENGINE LOAD DEMAND SPINDLE RIGGING (cont) 4-8-35

42. Lockwire capscrew (23) to capscrew (45). Use lockwire (E29).

43. Install capscrew (25) in gearbox hole (44).

44. Lockwire capscrew (25) to capscrew (46). Use lockwire (E29).



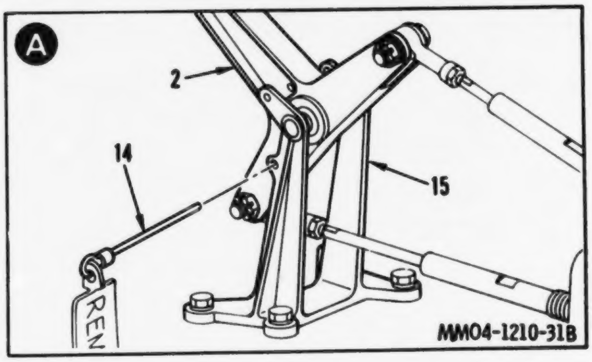
45. Remove -7 rig pin (14) from bracket (15) and bellcrank (2).

46. Disconnect AGPU (para 1-7-16 and 1-7-18).

47. Perform power plant operational check (engine 1 and engine 2) (TM 55-1520-238-T).

48. Secure engine work platform doors LN1, RN1 and access panel L200. (para 2-2-2).

49. Inspect (TI).



END OF TASK

4-8-36. NO. 1 ENGINE POWER AVAILABLE SPINDLE SYSTEM RIGGING CHECK 4-8-36

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Aviation Ground Power Unit	1730-01-144-1897

Materials/Parts:

(E29) Lockwire

Personnel Required:

67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

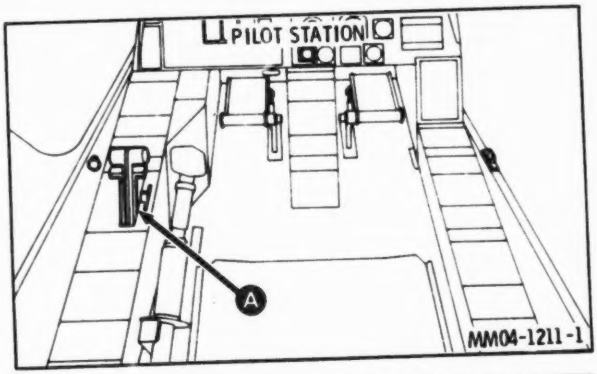
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door LN1 opened
4-2-5	No. 1 engine shroud removed

1. **Connect AGPU** (para 1-7-16 and 1-7-18). **Observe all safety precautions.**

2. **Enter pilot station** (para 1-7-1). **Observe all safety precautions.**

3. **Apply electrical power** (para 1-7-16).

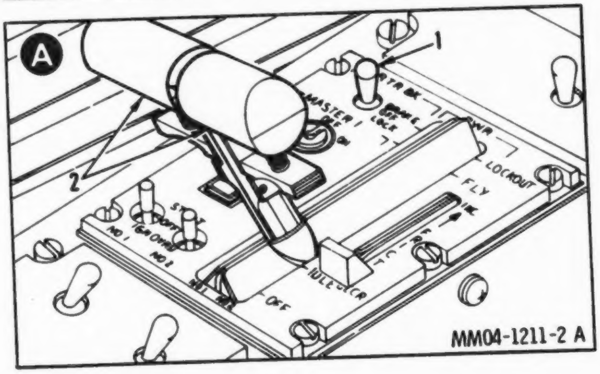

PILOT STATION
A
MM04-1211-1

4. **Set pilot rotor brake switch (1) to OFF**

   a. Set pilot RTR BK switch (1) to OFF.

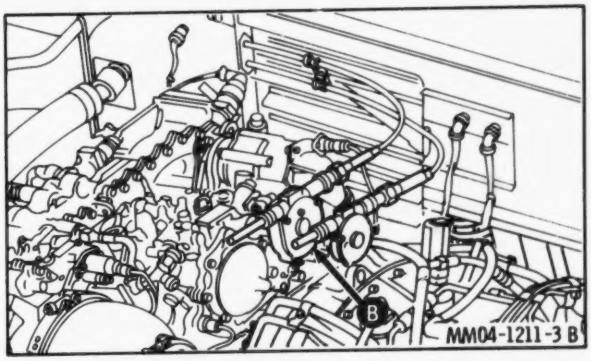
   b. Shut off electrical power, (para 1-7-16).

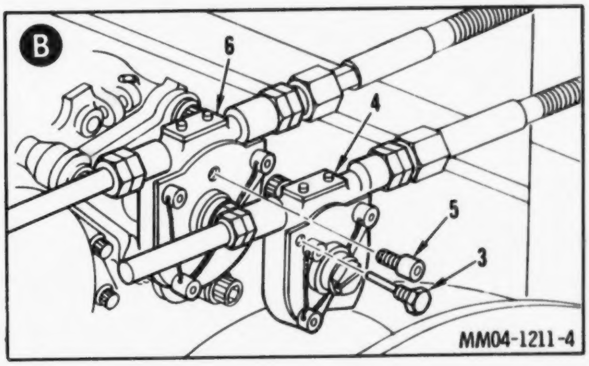
5. **Move pilot power lever No. 1 (2) to IDLE.**


A
1
2
MASTER
RTR BK
BRAKE
OFF
LOCK
PWR
LOCKOUT
FLY
START
IGNITION
NO 1
NO 2
IDLE
OFF
MM04-1211-2 A

GO TO NEXT PAGE

4-8-36. NO. 1 ENGINE POWER AVAILABLE SPINDLE SYSTEM RIGGING CHECK (cont) 4-8-36





6. **Remove rig pin (3) from load demand spindle gearbox (4).** Remove lockwire and pin (3).
7. **Remove capscrew (5) from power available spindle gearbox (6).** Remove lockwire and capscrew (5).

NOTE

The power available spindle system is out of rig when any of the following conditions exist. (Refer to paragraph 4-8-32).

a. Rig pin cannot be inserted when power lever is in **IDLE**.

b. Power available spindle gearbox is not at zero-degrees when power lever is in OFF.

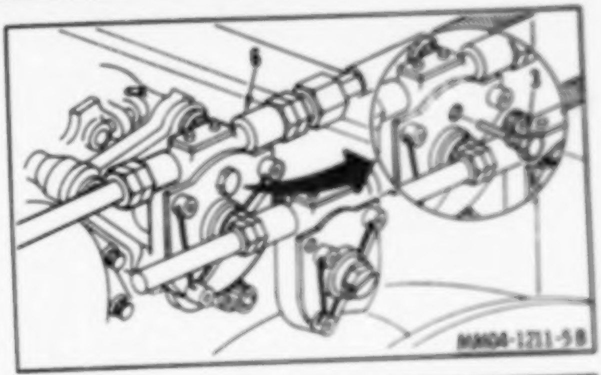
c. Power available spindle gearbox is not at 130 degrees when power lever is in **LOCKOUT**.

GO TO NEXT PAGE

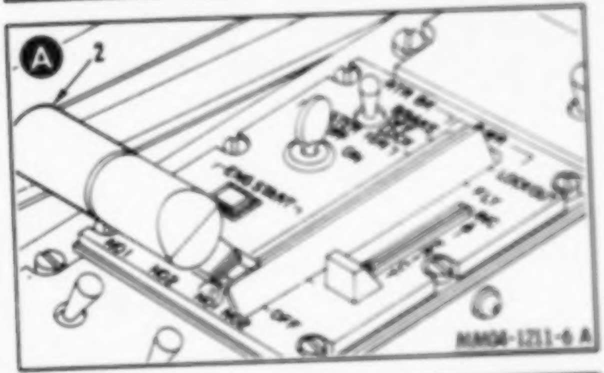
4-8-36. NO. 1 ENGINE POWER AVAILABLE SPINDLE SYSTEM RIGGING CHECK (cont) 4-8-36

8. Install rig pin (3) in power available spindle gearbox (6).

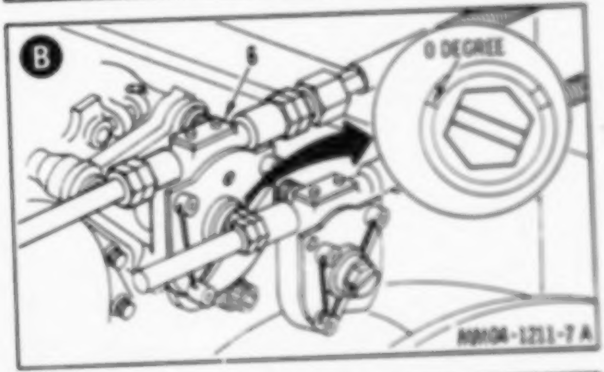
9. Remove rig pin (3) from power available spindle gearbox (6).



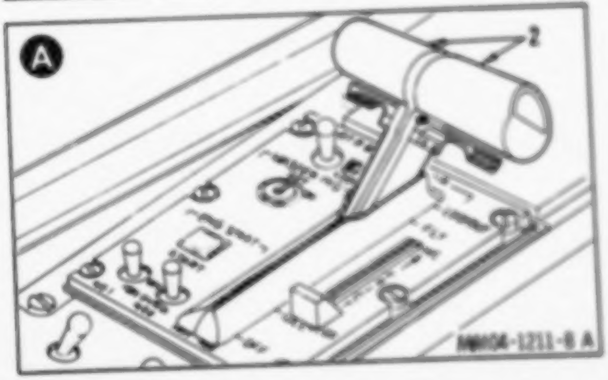
10. Move pilot power lever No. 1 (2) to OFF position.



11. Verify that power available spindle gearbox (6) is at ZERO DEGREE position.



12. Move pilot power lever NO. 1 (2) to LOCKOUT.



GO TO NEXT PAGE

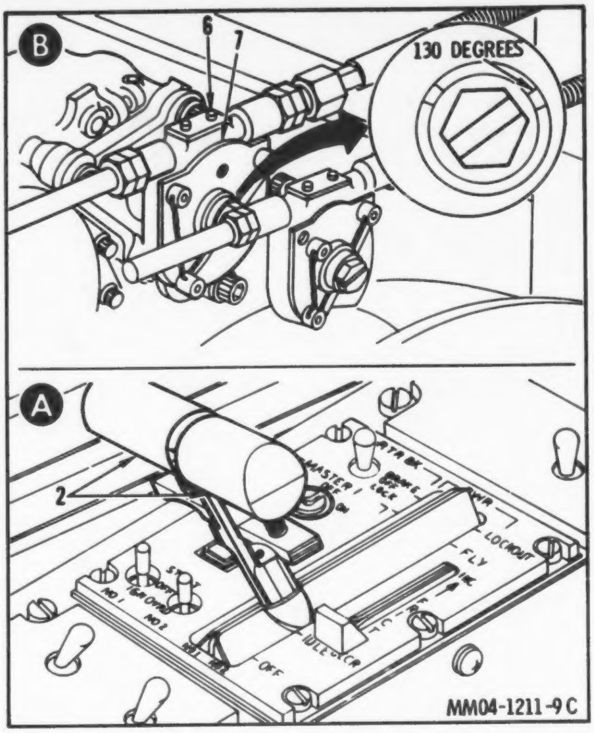
4-8-36. NO. 1 ENGINE POWER AVAILABLE SPINDLE SYSTEM RIGGING CHECK (cont) 4-8-36

13. Verify audible click from hydromechancial unit (HMU) (7) as No. 1 power lever (2) is advanced to LOCKOUT.

14. Verify that power available spindle gearbox (6) is at 130-DEGREE position.

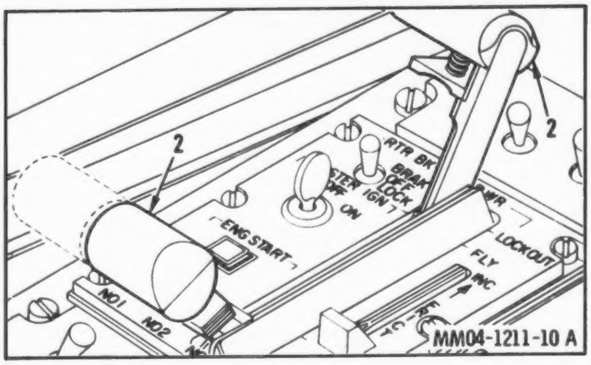
15. Move pilot power lever No. 1 (2) to IDLE.

16. Verify audible click from HMU (7) before pilot power lever No. 1 (2) bottoms against idle stop.


B
6
7
130 DEGREES
A
2
MASTER
LOCKOUT
FLY
INC
IDLE
OFF
NO1
NO2

MM04-1211-9 C

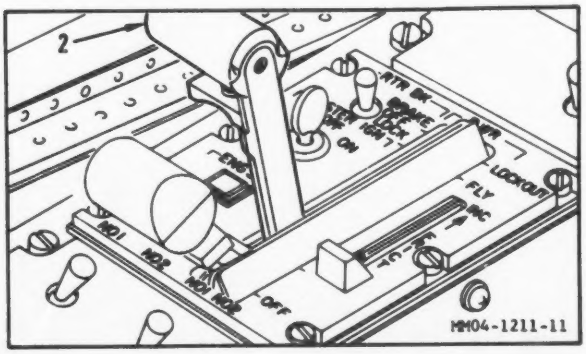
17. To verify springback, move pilot pilot power lever No. 1 (2) to LOCKOUT and back to OFF.


2
2
RTR BK
BRAKE
OFF
LOCK
IGN
ON
ENG START
LOCKOUT
FLY
INC
NO1
NO2

MM04-1211-10 A

18. Recheck IDLE position with rig pin installed

    a. Move pilot power lever No. 1 (2) to IDLE position.


2
RTR BK
BRAKE
OFF
LOCK
IGN
ON
LOCKOUT
FLY
INC
NO1
NO2
OFF

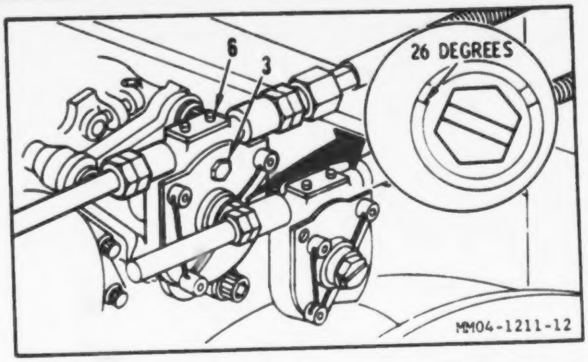
MM04-1211-11

GO TO NEXT PAGE

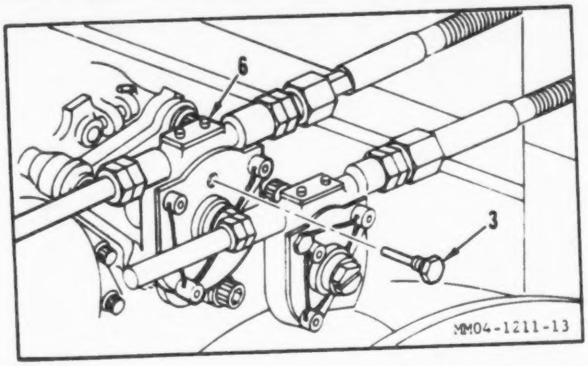
4-8-36. NO. 1 ENGINE POWER AVAILABLE SPINDLE SYSTEM RIGGING CHECK (cont) 4-8-36

b. Install rig pin (3) in power available spindle gearbox (6).

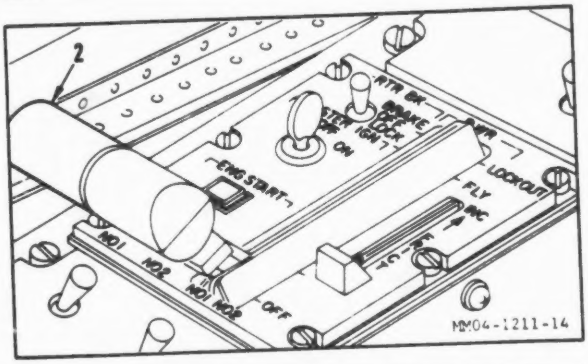
c. Verify that power available spindle gearbox (6) is at 26-DEGREE position.


6
3
26 DEGREES
MM04-1211-12

d. Remove rig pin (3) from power available spindle gearbox (6).

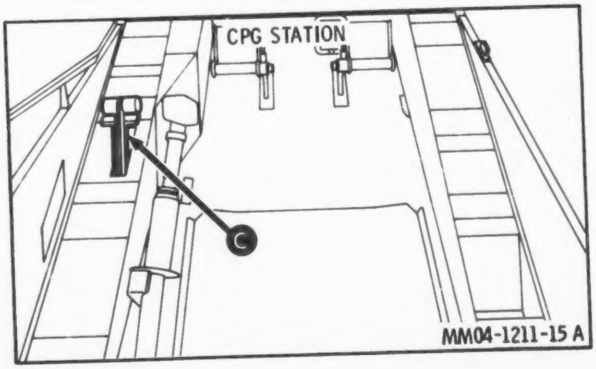

6
3
MM04-1211-13

e. Move pilot power lever No. 1 (2) to OFF.


2
RTR BK
BRAKE
OFF
LOCK
IGN
ON
PWR
LOCKOUT
FLY
ENG START
NO1
NO2
NO1 NO2
OFF
MM04-1211-14

19. Enter CPG station (para 1-7-1). Observe all safety precautions.

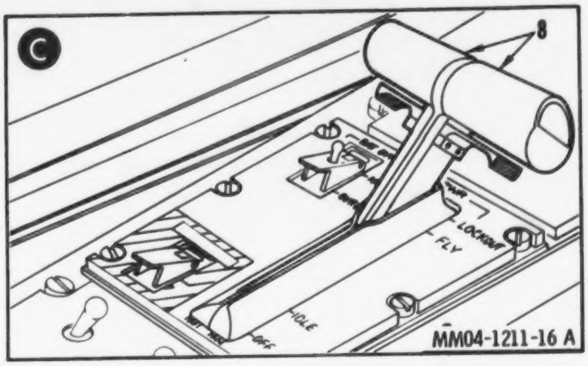
20. Apply electrical power.


CPG STATION
C
MM04-1211-15 A

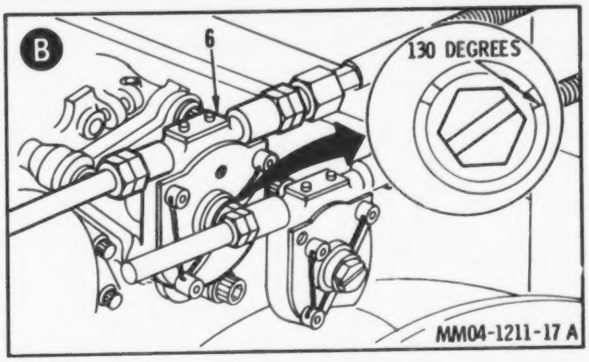
GO TO NEXT PAGE

4-8-36. NO. 1 ENGINE POWER AVAILABLE SPINDLE SYSTEM RIGGING CHECK (cont) 4-8-36

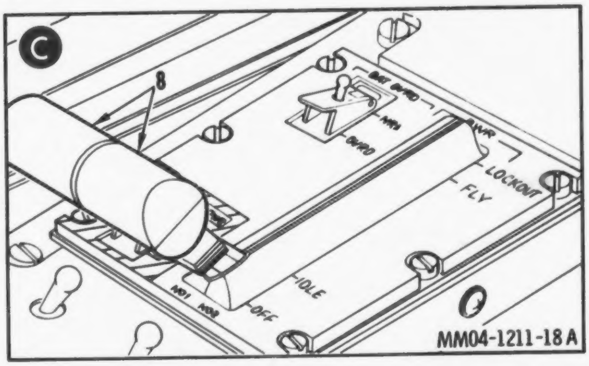
21. Move CPG No. 1 power lever (8) to LOCKOUT.


C
8
PWR
LOCKOUT
FLY
IDLE
OFF
MM04-1211-16 A

22. Verify that power available spindle gearbox (6) is at 130-DEGREE position.

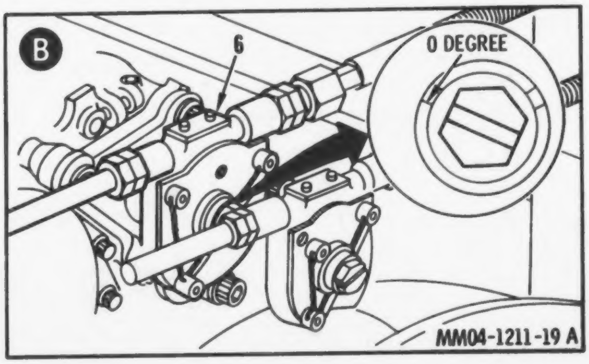

B
6
130 DEGREES
MM04-1211-17 A

23. Move CPG No. 1 power lever (8) to OFF.


C
8
PWR
LOCKOUT
FLY
IDLE
OFF
MM04-1211-18 A

24. Verify that power available spindle gearbox (6) is at ZERO DEGREE position.

25. Shut off electrical power (para 1-7-16).

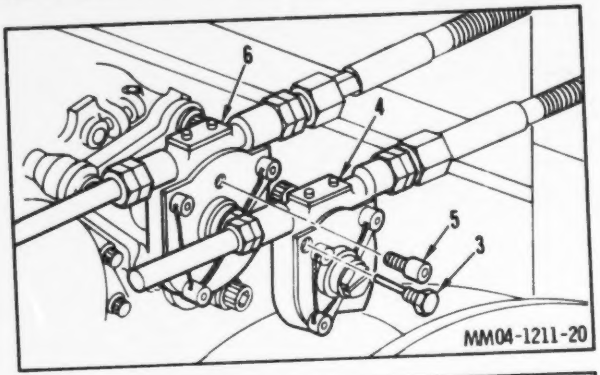

B
6
0 DEGREE
MM04-1211-19 A

GO TO NEXT PAGE

4-8-36. NO. 1 ENGINE POWER AVAILABLE SPINDLE SYSTEM RIGGING CHECK (cont) 4-8-36

26. Stow rig pin (3) in load demand gearbox (4). Install rig pin (3). Use 3/8 open-end wrench.

27. Install capscrew (5) in power available spindle gearbox (6). Install capscrew (5).



28. Lockwire rig pin (3) to capscrew (9) with lockwire (E25).

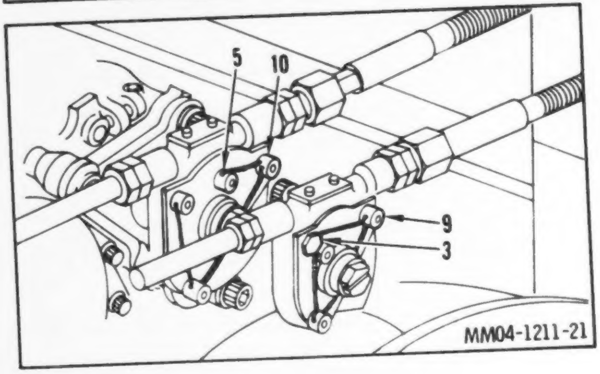
29. Lockwire capscrew (5) to capscrew (10) with lockwire (E29).

30. Inspect (TI).

31. Secure No. 1 engine shroud (para 4-2-46).

32. Secure engine work platform door LN1 (para 2-2-2).

33. Disconnect AGPU (para 1-7-16 and 1-7-18).



END OF TASK

4-8-37. NO. 2 ENGINE POWER AVAILABLE SPINDLE SYSTEM RIGGING CHECK 4-8-37

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Aviation Ground Power Unit	1730-01-144-1897

Materials/Parts:

(E29) Lockwire

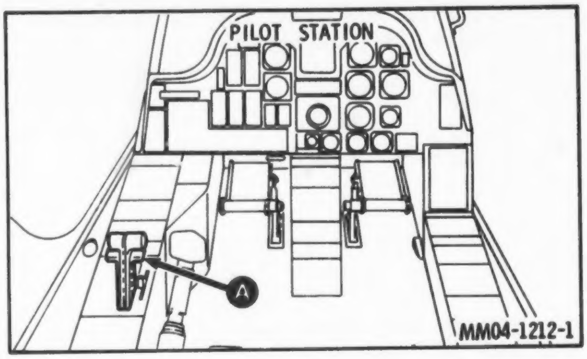
Personnel Required:

67R10	Attack Helicopter Repairer (2) One to assist in performing task
66R30	Inspector/Supervisor

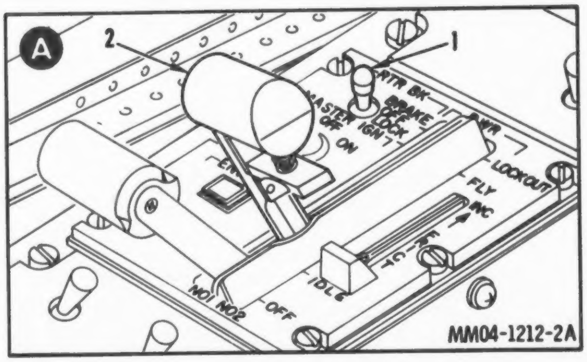
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door LN1 opened
4-2-9	No. 2 engine shroud removed

1. **Connect AGPU** (para 1-7-16 and 1-7-18). **Observe all safety precautions.**
2. **Enter pilot station** (para 1-7-1). **Observe all safety precautions.**
3. **Apply electrical power** (para 1-7-16).

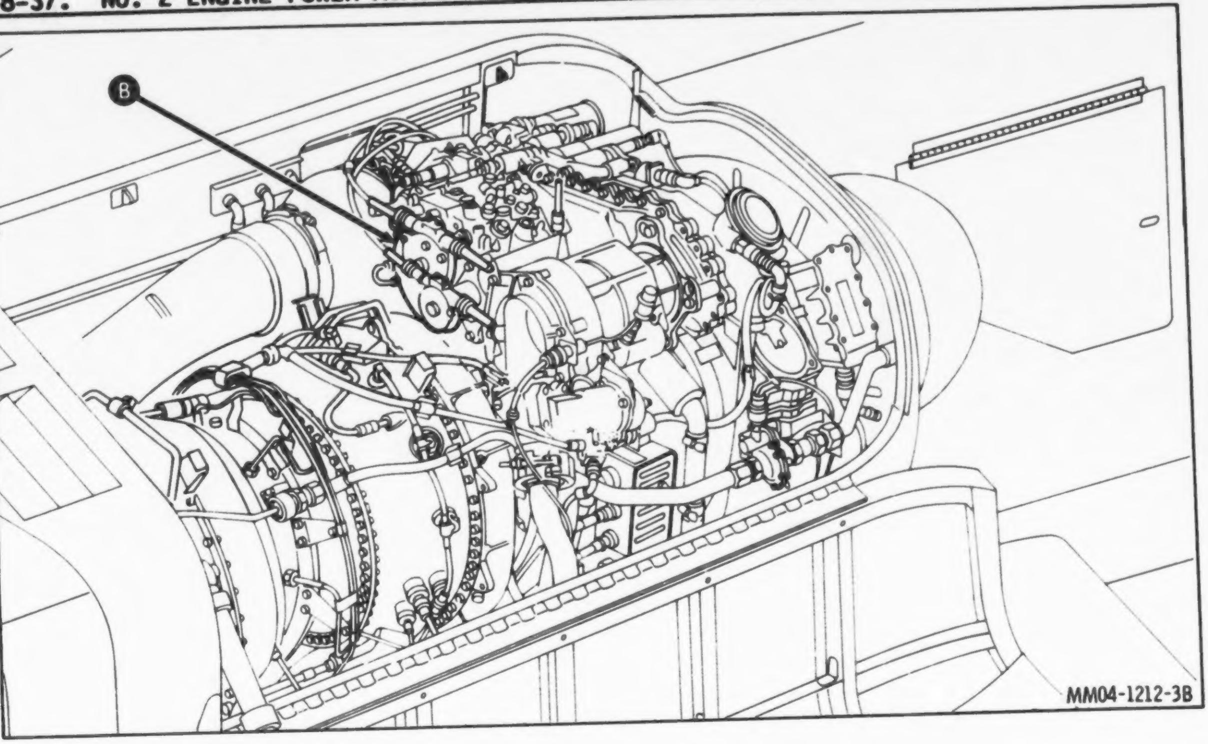

PILOT STATION
A
MM04-1212-1

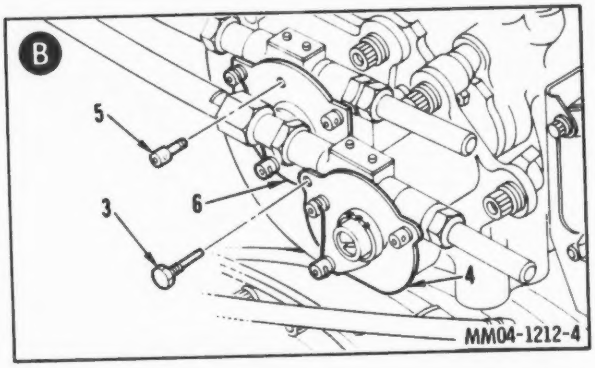
4. **Set pilot rotor brake switch (1) to OFF.**
   a. Set pilot RTR BK switch (1) to OFF.
   b. Shut off electrical power.
5. **Move pilot power lever No. 2 (2) to IDLE.**


A
2
1
RTR BK
BRAKE
OFF
LOCK
MASTER IGN
OFF ON
PWR
LOCKOUT
FLY
INC
IDLE
OFF
NO1 NO2
MM04-1212-2A

GO TO NEXT PAGE

4-8-37. NO. 2 ENGINE POWER AVAILABLE SPINDLE SYSTEM RIGGING CHECK (cont) 4-8-37





6. **Remove rig pin (3) from load demand spindle gearbox (4).** Remove lockwire and remove pin (3).

7. **Remove capscrew (5) from power available spindle gearbox (6).** Remove lockwire and remove capscrew (5).

NOTE

The power available spindle system is out of rig when any of the following conditions exist. (Refer to paragraph 4-8-33).

a. Rig pin cannot be inserted when power lever is in **IDLE**.

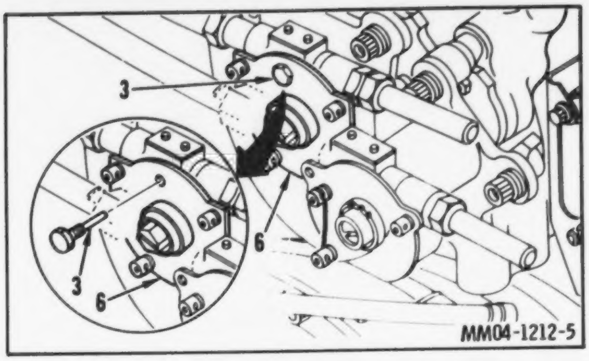
b. Power available spindle gearbox is not at zero degrees when power lever is in **OFF**.

c. Power available spindle gearbox not at 130 degrees when power lever is in **LOCKOUT**.

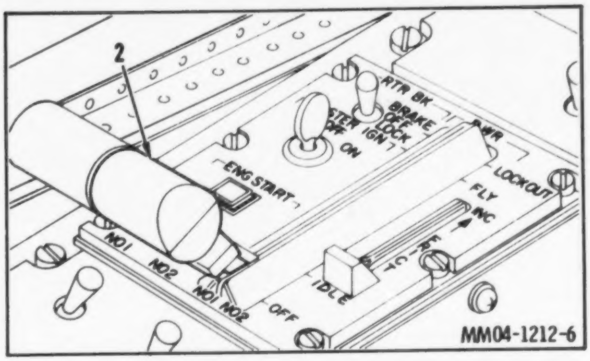
GO TO NEXT PAGE

4-8-37. NO. 2 ENGINE POWER AVAILABLE SPINDLE SYSTEM RIGGING CHECK (cont) 4-8-37

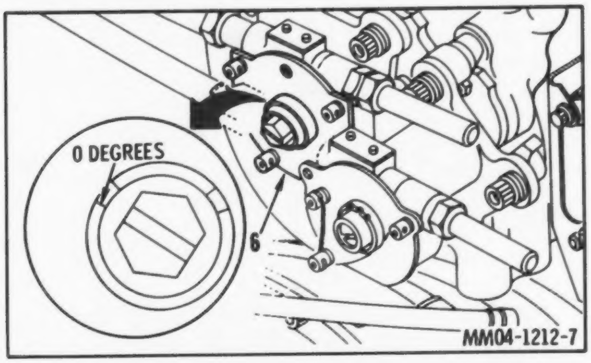
8. Install rig pin (3) in power available spindle gearbox (6).
9. Remove rig pin (3) from power available spindle gearbox (6).


3
6
3
6
MM04-1212-5

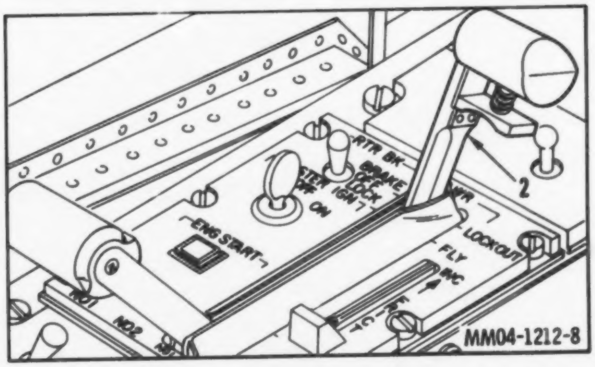
10. Move pilot No. 2 power lever (2) to OFF.


2
RTR BK
BRAKE
OFF
LOCK
STEM IGN
OFF ON
PWR
ENG START
LOCKOUT
FLY
INC
NO1
NO2
NO1
NO2
IDLE
OFF
MM04-1212-6

11. Verify that power available spindle gearbox (6) is at ZERO DEGREE SHUT-OFF.


0 DEGREES
6
MM04-1212-7

12. Move pilot No. 2 power lever (2) to LOCKOUT.


RTR BK
BRAKE
OFF
LOCK
STEM IGN
OFF ON
PWR
2
ENG START
LOCKOUT
FLY
INC
NO1
NO2
MM04-1212-8

GO TO NEXT PAGE

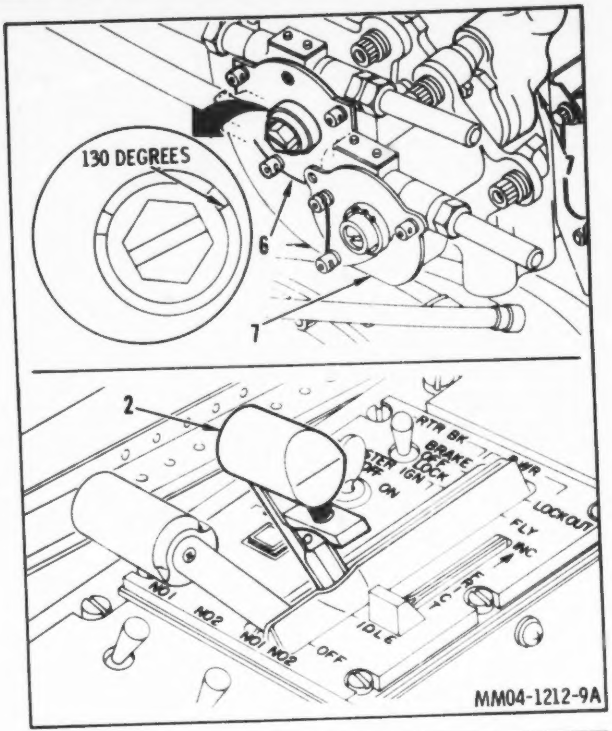
4-8-37. NO. 2 ENGINE POWER AVAILABLE SPINDLE SYSTEM RIGGING CHECK (cont) 4-8-37

13. Verify audible click from hydromechancial unit (HMU) (7) as power lever No. 2 (2) is advanced to LOCKOUT.

14. Verify that power available spindle gearbox (6) is at 130-DEGREES.

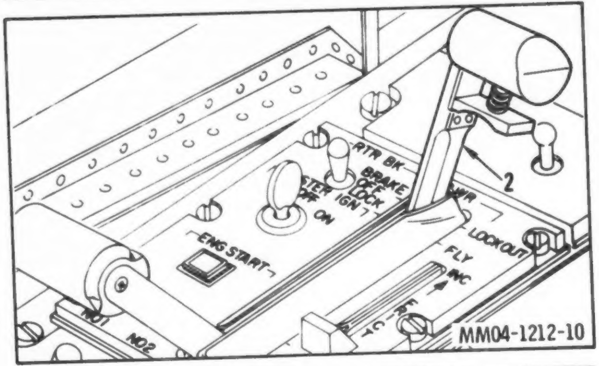
15. Move pilot power lever No. 2 (2) to IDLE.

16. Verify audible click from HMU (7) before pilot power lever No. 2 (2) bottoms against idle stop.


130 DEGREES
6
7
7
2
RTR BK
BRAKE
OFF
LOCK
STER IGN
OFF
ON
PWR
LOCKOUT
FLY
INC
NO1
NO2
NO1 NO2
IDLE
OFF

MM04-1212-9A

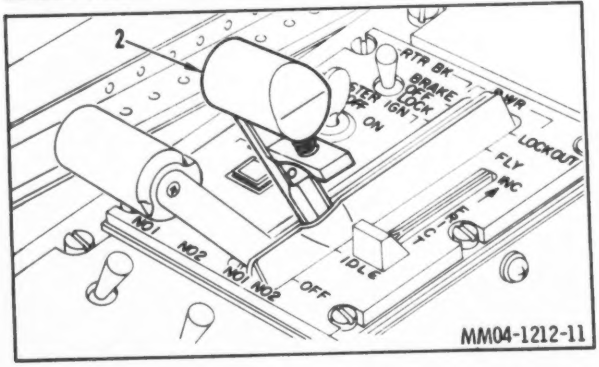
17. To verify springback, move pilot power lever No. 2 (2) to LOCKOUT and back to OFF.


2
RTR BK
BRAKE
OFF
LOCK
STER IGN
OFF
ON
ENG START
PWR
LOCKOUT
FLY
INC
NO1
NO2

MM04-1212-10

18. Recheck IDLE position with rig pin installed.

    a. Move pilot No. 2 power lever (2) to IDLE.


2
RTR BK
BRAKE
OFF
LOCK
STER IGN
OFF
ON
PWR
LOCKOUT
FLY
INC
NO1
NO2
NO1 NO2
IDLE
OFF

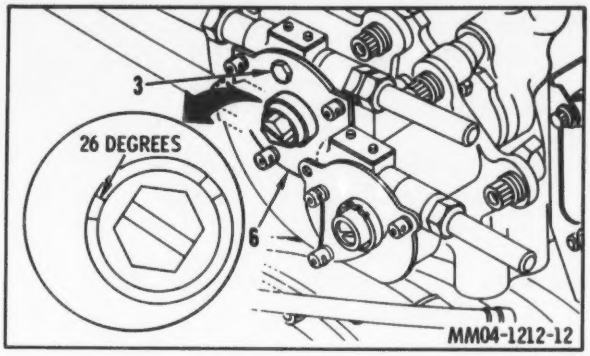
MM04-1212-11

GO TO NEXT PAGE

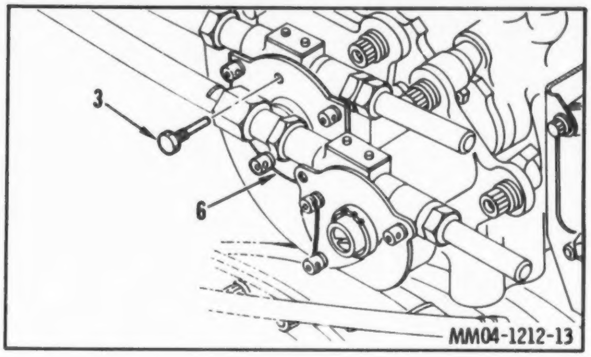
4-8-37. NO. 2 ENGINE POWER AVAILABLE SPINDLE SYSTEM RIGGING CHECK (cont) 4-8-37

b. Install rig pin (3) in power available spindle gearbox (6).

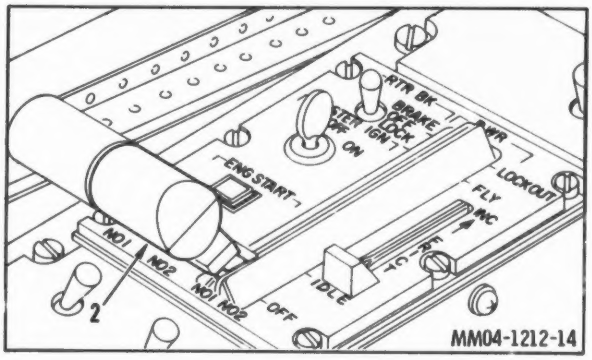
c. Verify that power available spindle gearbox (6) is at 26 degrees.


3
26 DEGREES
6
MM04-1212-12

d. Remove rig pin (3) from power available spindle gearbox (6).

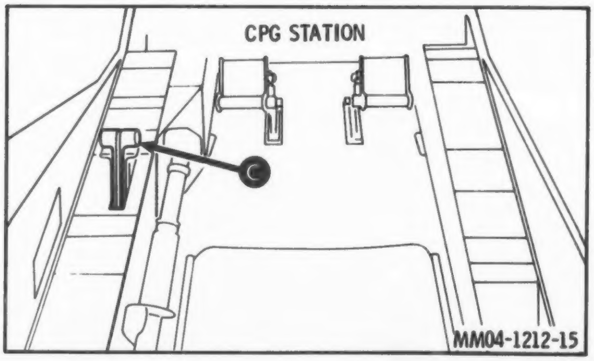

3
6
MM04-1212-13

e. Move pilot power lever No. 2 (2) to OFF.


RTR BK
BRAKE
OFF
LOCK
PWR
STEER IGN
OFF ON
ENG START
LOCKOUT
FLY
INC
IDLE
NO1
NO2
NO1
NO2
OFF
2
MM04-1212-14

19. Enter copilot gunner (CPG) station (para 1-7-1). Observe all safety precautions.

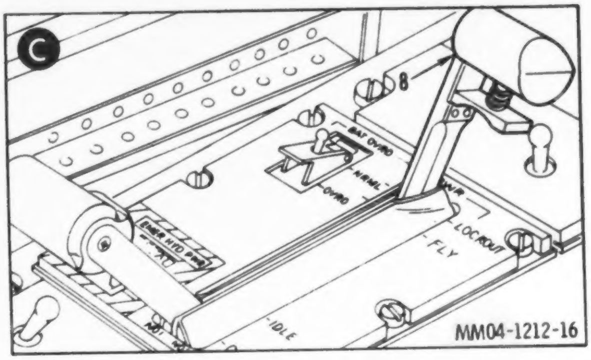
20. Apply electrical power (para 1-7-16).


CPG STATION
MM04-1212-15

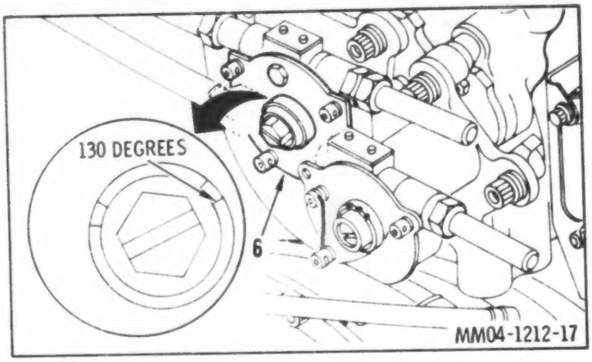
GO TO NEXT PAGE

4-8-37. NO. 2 ENGINE POWER AVAILABLE SPINDLE SYSTEM RIGGING CHECK (cont) 4-8-37

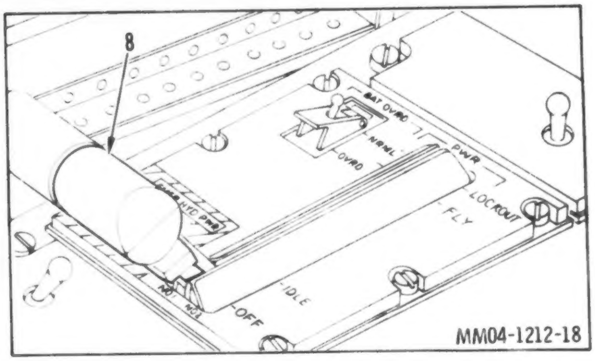
21. Move CPG power lever No. 2 (8) to LOCKOUT.


C
8
BAT OVRD
NRML
OVRD
EMER HYD PWR
PWR
LOCKOUT
FLY
IDLE
MM04-1212-16

22. Verify that power available spindle gearbox (6) is at 130-DEGREES.

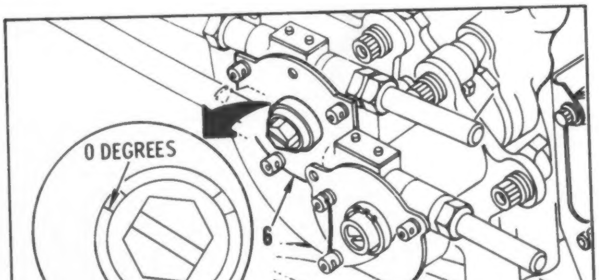

130 DEGREES
6
MM04-1212-17

23. Move CPG power lever No. 2 (8) to OFF.


8
BAT OVRD
NRML
OVRD
EMER HYD PWR
PWR
LOCKOUT
FLY
IDLE
OFF
MM04-1212-18

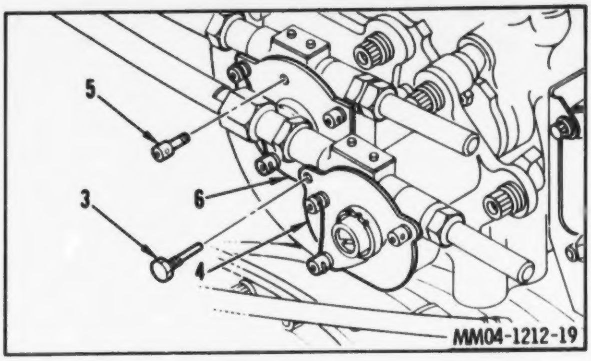
24. Verify that power available spindle gearbox (6) is at ZERO-DEGREE.

25. Shut off electrical power (para 1-7-16).


0 DEGREES
6
MM04-1212-20

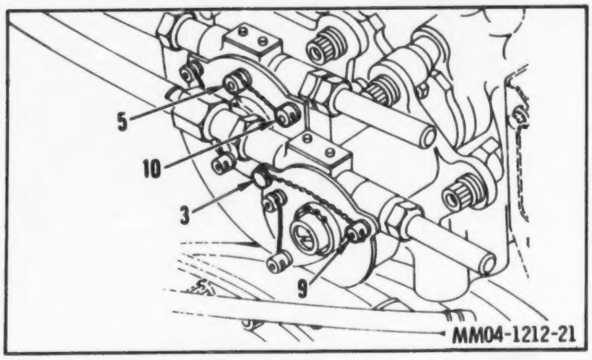
GO TO NEXT PAGE

4-8-37. NO. 2 ENGINE POWER AVAILABLE SPINDLE SYSTEM RIGGING CHECK (cont) 4-8-37



26. **Stow rig pin (3) in load demand gearbox (4).** Install rig pin (3).

27. **Install capscrew (5) on power available spindle gearbox (6).** Install capscrew (5).



28. **Lockwire rig pin (3) to capscrew (9) with lockwire (E29).**

29. **Lockwire capscrew (5) to capscrew (10) with lockwire (E29).**

30. **Inspect (TI).**

31. **Install No. 2 engine shroud** (para 4-2-49).

32. **Secure engine work platform panel RN1** (para 2-2-2).

33. **Disconnect ground power unit** (para 1-7-16 and 1-7-18).

END OF TASK

4-8-38. PILOT POWER QUADRANT INDICATING LIGHT PANEL REMOVAL 4-8-38

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915

Personnel Required:

68F10 Aircraft Electrician

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

A. REMOVAL

1. **Enter pilot station (para 1-7-1). Observe all safety precautions.**

2. **Remove friction power lever (1).**

   a. Remove screw (2) from control knob (1).

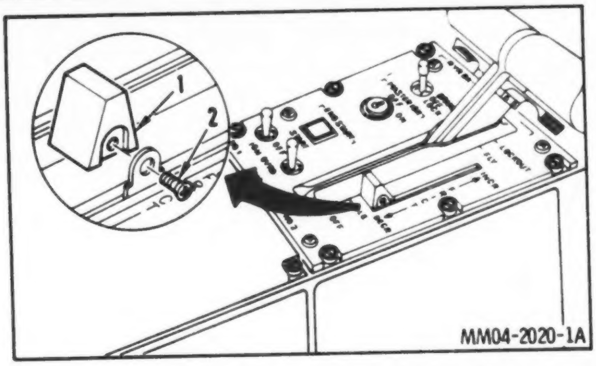
   b. Remove control knob (1).

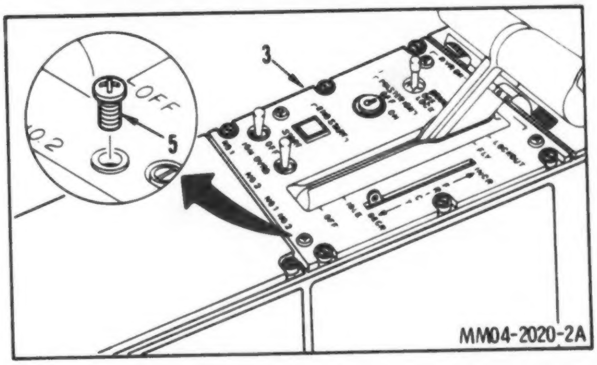
3. **Remove panel (3) from power quadrant (4).**

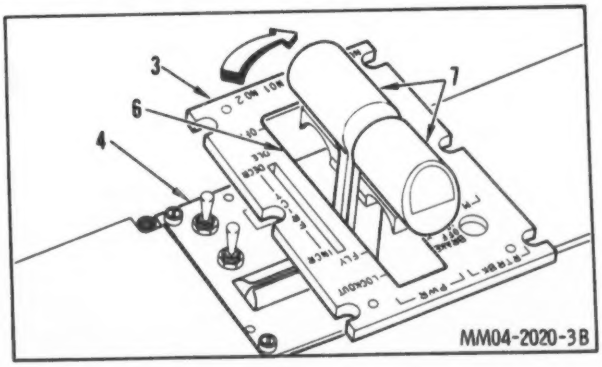
   a. Remove four screws (5) from panel (3).

   b. Lift panel (3) from power quadrant (4) and turn it 90 degrees clockwise.

   c. Aline slot (6) with power lever handles (7). Lift off panel (3).







B. CLEANING

Wipe panel with clean rag.

C. INSPECTION

Check power quadrant and panel for cracks. None allowed.

END OF TASK

4-8-39. PILOT POWER QUADRANT INDICATING LIGHT PANEL INSTALLATION 4-8-39

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairman's	5180-00-323-4915

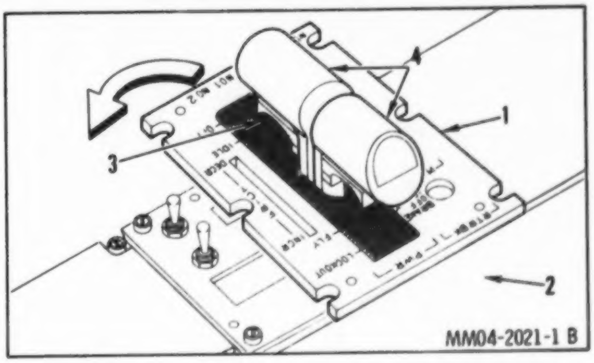
Personnel Required:

68F10	Aircraft Electrician
66R30	Inspector/Supervisor

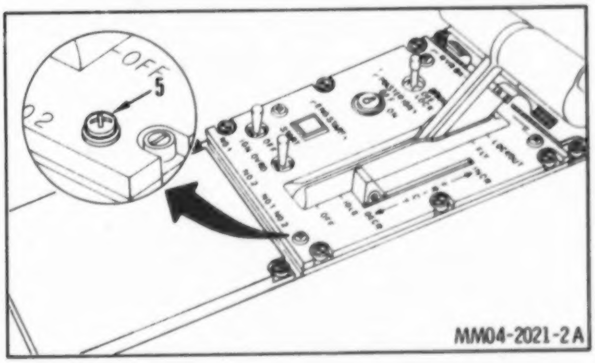
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

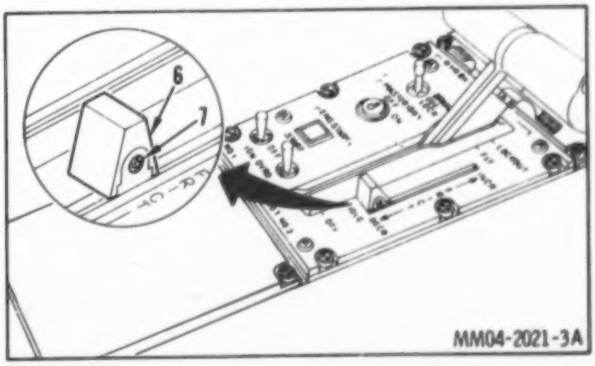
1. **Enter pilot station (para 1-7-1). Observe all safety precautions.**



2. **Install panel (1) on power quadrant (2).**
   a. Rotate panel (1) 90 degrees counterclockwise and aline slot (3) in panel (1) with power lever handle (4).
   b. Push panel (1) over power lever handle (4).
   c. Turn panel (1) until it lines up with holes in power quadrant (2).
   d. Install four screws (5).



3. **Install friction power lever (6).** Install one screw (7).
4. **Inspect (TI).**
5. **Perform power plant operational check (engine 1 and engine 2)** (TM 55-1520-238-T).



END OF TASK

4-8-40. PILOT POWER QUADRANT PANEL - RTR BRK SWITCH REMOVAL/INSTALLATION 4-8-40

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915

Personnel Required:

68F10 Aircraft Electrician
66R30 Inspector/Supervisor

References:

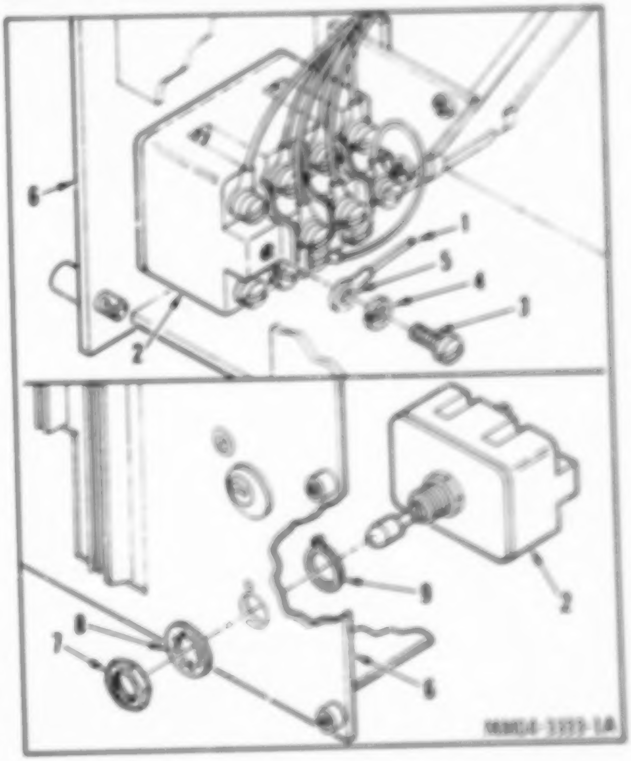
TM 55-1520-238-T
TM 55-1500-323-24

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-8-20	Pilot power quadrant removed
4-8-38	Pilot power quadrant indicating light panel removed

A. REMOVAL

1. **Disconnect three wires (1) from switch (2).**
   a. Identify wires (1).
   b. Remove eight screws (3), lock washers (4), and terminal lugs (5).
2. **Remove switch (2) from panel (6).** Remove nut (7), lockwasher (8), and lockring (9).



B. CLEANING

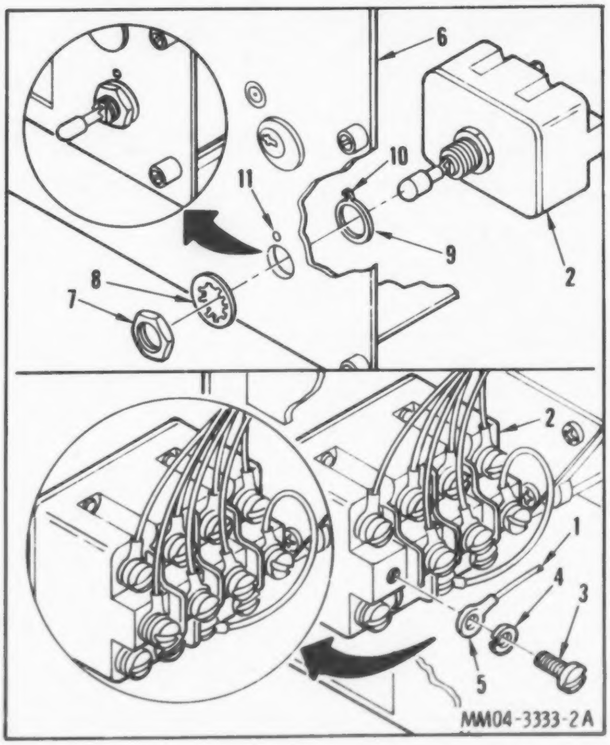
Wipe all removed and attaching parts with a clean dry rag.

C. INSPECTION

Check mounting surfaces and attaching parts for cracks. Check wires for cuts, cracks, and damaged connections (TM 55-1500-323-24).

GO TO NEXT PAGE

4-8-40. PILOT POWER QUADRANT PANEL - RTR BRK SWITCH REMOVAL/INSTALLATION (cont) 4-8-40



D. INSTALLATION

1. **Install switch (2) onto panel (6).**
   a. Insert switch (2) through lockring (9), onto panel (6) seating tab (10) on lockring (9) in locator hole (11).
   b. Install lock washer (8) and nut (7).
2. **Attach wires (1) to switch (2).** Install eight terminal lugs (5), lock washers (4), and screws (3).
3. **Inspect (TI).**
4. **Install pilot power quadrant edge lighted panel** (para 4-8-39).
5. **Install pilot power quadrant panel** (para 4-8-21).
6. **Perform power plants operational check (engine 1 and engine 2)** (TM 55-1520-238-T).

END OF TASK

4-8-41. PILOT POWER QUADRANT PANEL - ENG START ADVISORY SWITCH REMOVAL/INSTALLATION (AVIM) 4-8-41

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Soldering Iron, Electric	3439-00-853-8760
Heater, Gun-Type, Electric	4940-00-785-1162

Materials/Parts:

(E50) Solder

Personnel Required:

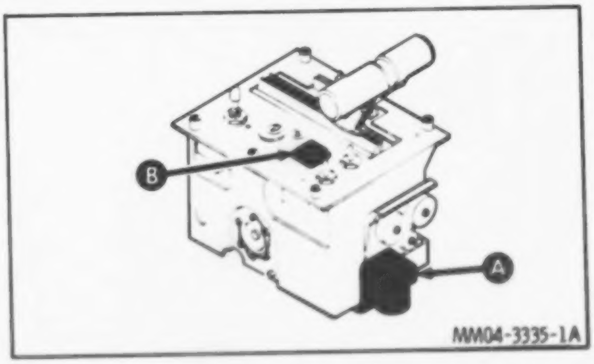
68F10	Aircraft Electrician
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T
TM 55-1500-323-24

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-8-20	Pilot power quadrant removed
4-8-38	Pilot power quadrant indicating light panel removed

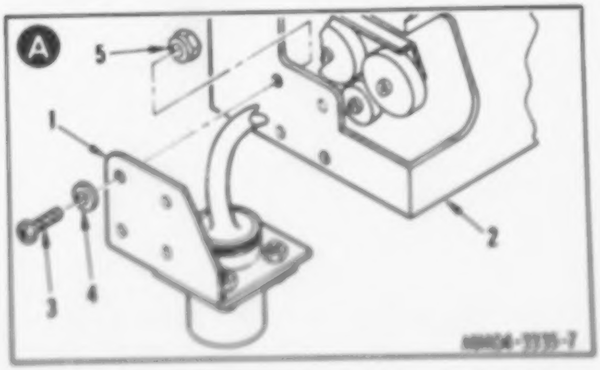


A. REMOVAL

1. **Remove bracket (1) from panel (2).**

   a. Remove four screws (3), washers (4), and lock nuts (5).

   b. Remove tie wraps as required.



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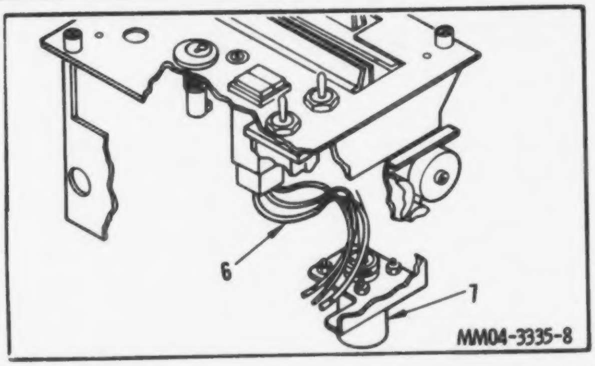
4-8-41. PILOT POWER QUADRANT PANEL - ENG START ADVISORY SWITCH REMOVAL/INSTALLATION (AVIM) (cont) 4-8-41

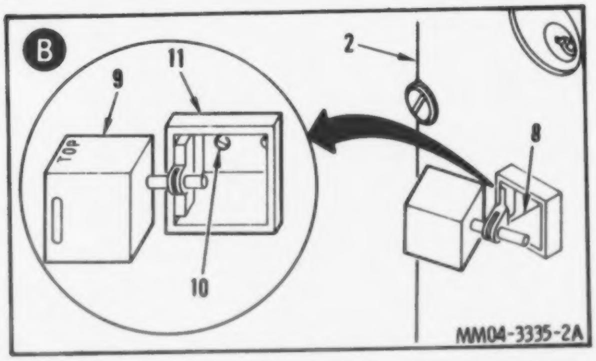


2. Depin three wires (6) from connector J1 (7).

   a. Identify wires (6).

   b. Depin three wires (6) from connector J1 (7).

   c. Remove connector J1 (7) with bracket (1).



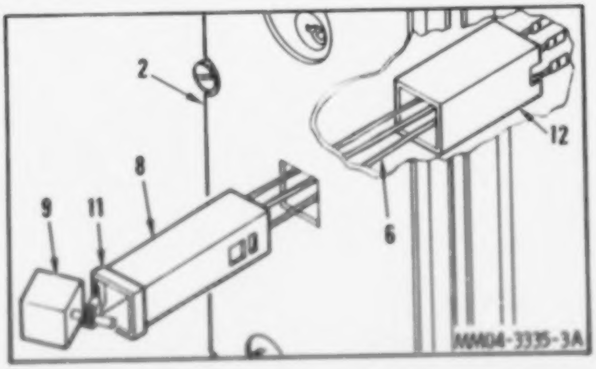
3. Remove advisory light (8) from panel (2).

   a. Pull out on lens (9) and move to one side.

   b. Loosen two screws (10).

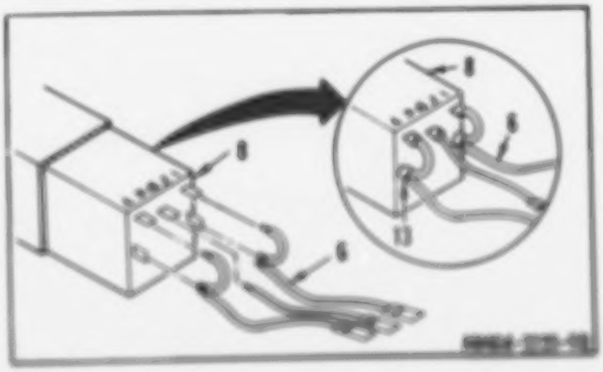
   c. Hold spacer (11) and pull sleeve (12) from advisory light (8).

   d. Pull advisory light (8) and attaching wires (6) from panel (2).



WARNING

Soldering iron can cause severe burns to personnel and start fires. Observe all safety precautions when using soldering iron. If injury occurs, seek medial aid.



4. Remove wires (6) from advisory light (8).

   a. Identify three wires (6).

   b. Remove heat shrink tubing (13).

   c. De-solder wires (6). Use soldering iron (TM 55-1500-323-24).

GO TO NEXT PAGE

4-8-41. PILOT POWER QUADRANT PANEL - ENG START ADVISORY SWITCH REMOVAL/INSTALLATION (AVIM) (cont) 4-8-41

B. CLEANING

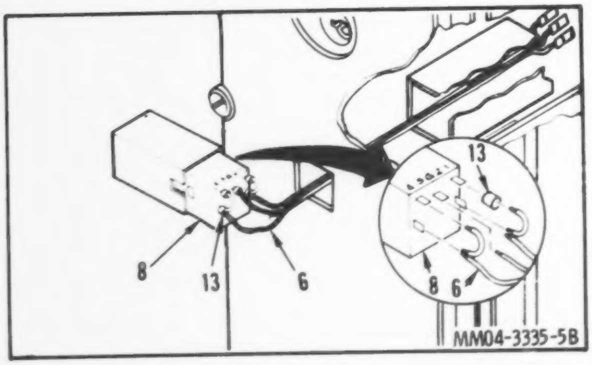
Wipe all removed and attaching parts with a clean dry rag.

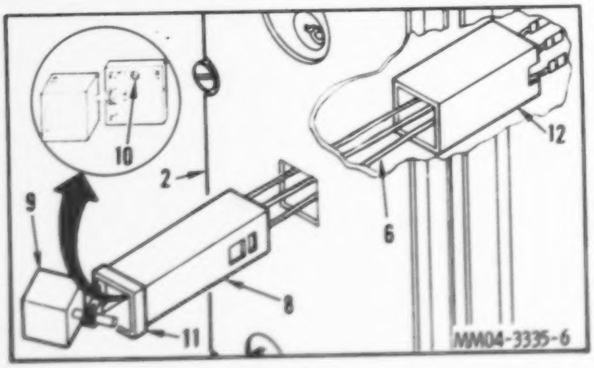
C. INSPECTION

1. Check mounting surfaces and attaching parts for cracks. None allowed.
2. Check wires for cuts, cracks, and damaged connections (TM 55-1500-323-24).

D. INSTALLATION

1. Connect three wires (6) to advisory light (8).
   a. Install heat shrink tubing (13) over (6) wires (TM 55-1500-323-24).
   b. Solder wires (6) to advisory light (8). Use solder (E50).
   c. Install heat shrink tubing (13) over soldered connections (TM 55-1500-323-24).
   d. Heat shrink tubing (13) with heat gun.
2. Install advisory light (8) on panel (2).
   a. Insert advisory light (8) and wires (6) through opening in panel (2).
   b. Hold spacer (11) and position sleeve (12) on advisory light (8).
   c. Tighten two screws (10).
   d. Push in lens (9) to seat in pace.





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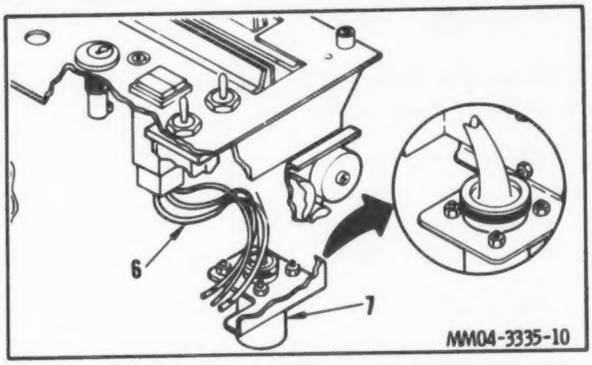
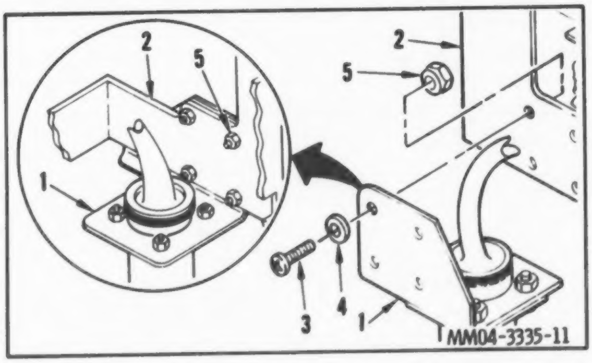
4-8-41. PILOT POWER QUADRANT PANEL - ENG START ADVISORY SWITCH REMOVAL/INSTALLATION (AVIM) (cont) 4-8-41

3. **Insert three wires (6) into connector (7).**
   a. Insert three wires (6) into connector J1 (7).
   b. Install tie wraps.



4. **Install bracket (1) onto panel (2).** Install four washers (4), four screws (3), and four lock nuts (5).



5. **Inspect (TI).**
6. **Install pilot power quadrant edge lighted panel** (para 4-8-39).
7. **Install pilot power quadrant panel** (para 4-8-21).
8. **Perform power plant operational check (engine 1 and engine 2)** (TM 55-1520-238-T).

END OF TASK

4-8-42. PILOT POWER QUADRANT PANEL - ENG IGN OVRD SWITCH REMOVAL/INSTALLATION

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915

Personnel Required:

68F10	Aircraft Electrician
66R30	Inspector/Supervisor

References:

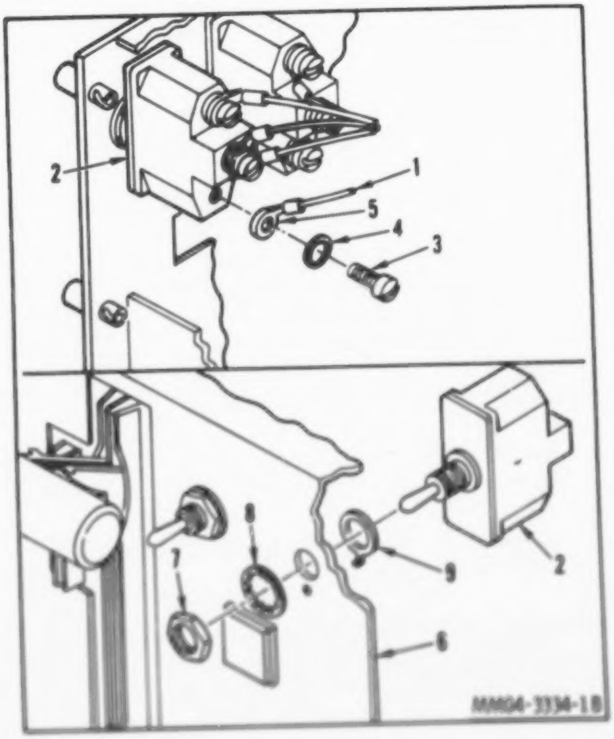
TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-8-20	Pilot power quadrant removed
4-8-38	Pilot power quadrant indicating light panel removed

NOTE

This task is typical for engine No. 1 or engine No. 2 **ENG IGN OVRD** switches.



A. REMOVAL

1. **Detach wires (1) from ENG IGN OVRD switch (2).**

   a. Identify wires (1).

   b. For engine No. 1 switch (2), remove three screws (3), lock washers (4), and four terminal lugs (5) from switch (2).

   c. For engine No. 2 switch (2), remove three screws (3), lock washers (4), and terminal lugs (5) from switch (2).

2. **Remove ENG IGN OVRD switch (2) from panel (6).** Remove nut (7), lock washer (8) and lockring (9).

B. CLEANING

Wipe all removed and attaching parts with a clean rag.

GO TO NEXT PAGE

4-8-42. PILOT POWER QUADRANT PANEL - ENG IGN OVRD SWITCH REMOVAL/INSTALLATION (AVIM) (cont)

C. INSPECTION

1. Check mounting surfaces and attaching parts for cracks. None allowed.

2. Check wires for cuts, cracks, and damaged connections (TM 55-1500-323-24).

D. INSTALLATION

1. Install ENG IGN OVRD switch (2) on panel (6).

   a. Insert switch (2) through lockring (9), on panel (6) so that tab (10) on lockring (9) seats in locator hole (11).

   b. Install lock washer (8) and nut (7).

2. Attach wires (1) to ENG IGN OVRD switch (2).

   a. For engine No. 1 switch (2), install four terminal lugs (5), three lock washers (4), three screws (3) on switch (2).

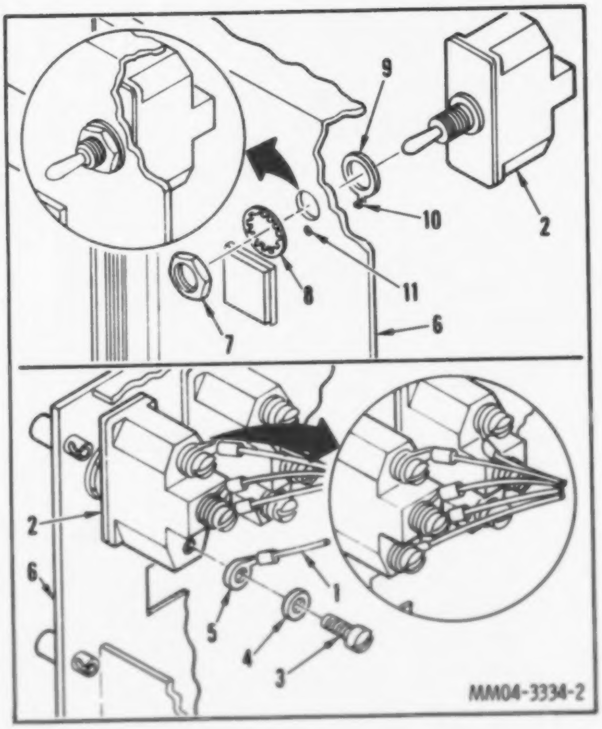
   b. For engine No. 2 switch (2), install three terminal lugs (5), three lock washers (4), and three screws (3) onto switch (2).

3. Inspect (TI).

4. Install pilot power quadrant indicating panel (para 4-8-39).

5. Install pilot power quadrant panel (para 4-8-21).

6. Perform power plant operational check (engine 1 and engine 2) (TM 55-1520-238-T).



END OF TASK

4-8-43. PILOT POWER QUADRANT PANEL - IGNITION LOCK SWITCH REMOVAL/INSTALLATION (AVIM) 4-8-43

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Crowfoot Attachment, 7/8, 3/8 Drive	5180-00-181-6765

Personnel Required:

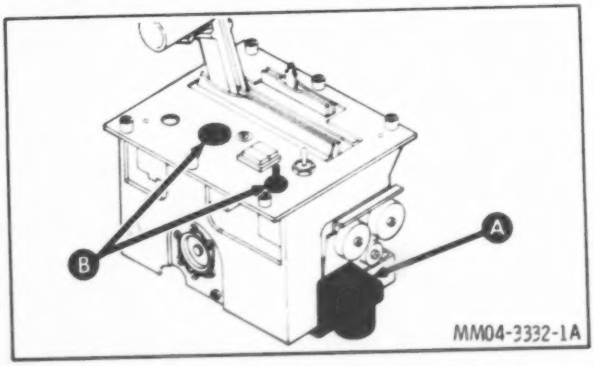
68F10	Aircraft Electrician
66R30	Inspector/Supervisor

References:

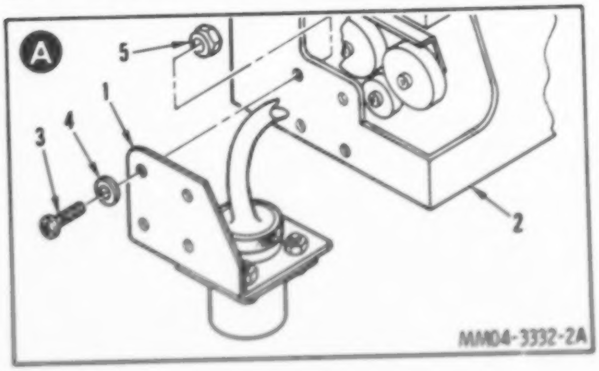
TM 55-1520-238-T
TM 55-1500-323-24

Equipment Conditions:

Ref	Conditions
1-7-2	Helicopter safed
4-8-20	Pilot power quadrant removed
4-8-38	Pilot power quadrant indicating light panel removed
4-8-40	RTR BRK switch removed



MM04-3332-1A



MM04-3332-2A

A. REMOVAL

1. **Remove bracket (1) from panel (2).**

   a. Remove four screws (3), washers (4) and lock nuts (5).

   b. Remove tiewraps as required.

GO TO NEXT PAGE

4-8-43. PILOT POWER QUADRANT PANEL - IGNITION LOCK SWITCH REMOVAL/INSTALLATION (AVIM) (cont)

2. **Identify and remove wire (6) from connector J1 (7).**

   a. Identify wire (6).

   b. Depin wire (6) from connector J1 (7).

3. **Identify and remove wires (8) and (9) from ENG NO. 1 IGN OVRD switch (10).**

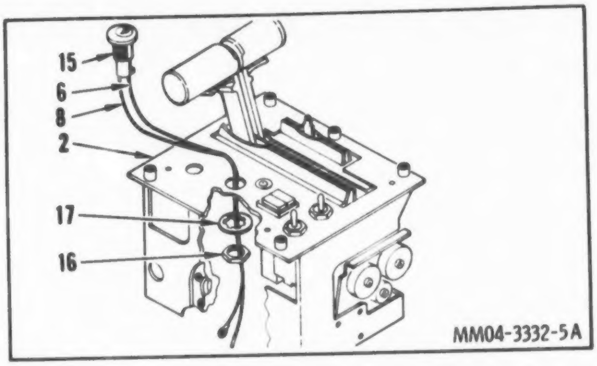
   a. Identify wires (8) and (9).

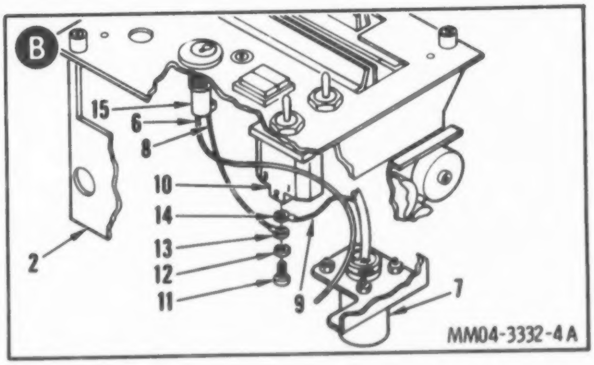
   b. Remove screw (11), lock washer (12), and two terminal lugs (13) and (14).

4. **Remove MASTER IGN switch (15) from panel (2).**

   a. Remove nut (16) and lock washer (17).

   b. Pull switch (15) with detached wires (6) and (8) gently from panel (2).





B. CLEANING

Wipe mounting surface with a clean dry rag.

C. INSPECTION

1. **Check mounting surfaces and attaching parts for cracks.** None allowed.

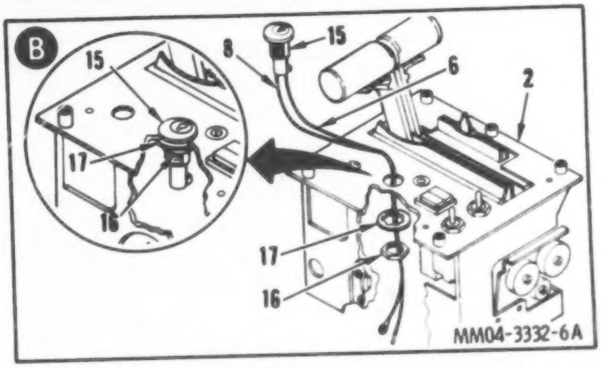
2. **Check wires for cuts, cracks, and damaged connections** (TM 55-1500-323-24).

GO TO NEXT PAGE

4-8-43. PILOT POWER QUADRANT PANEL - IGNITION LOCK SWITCH REMOVAL/INSTALLATION (AVIM) (cont)

D. INSTALLATION

1. Install MASTER IGN switch (15) on panel (2).
   a. Guide wires (6) and (8) through panel (2) and seat switch (15) in panel (2).
   b. Install lock washer (17) and nut (16).
2. Insert MASTER IGN switch (15) wire (6) into connector J1 (7).
3. Attach wires (8) and (9) onto ENG NO. 1 IGN OVRD switch (10). Install two terminal lugs (13) and (14), washer (12), and screw (11) on terminal 2 (18) of switch (10).
4. Install RTR BRK switch (para 4-8-40).
5. Install required tiewraps.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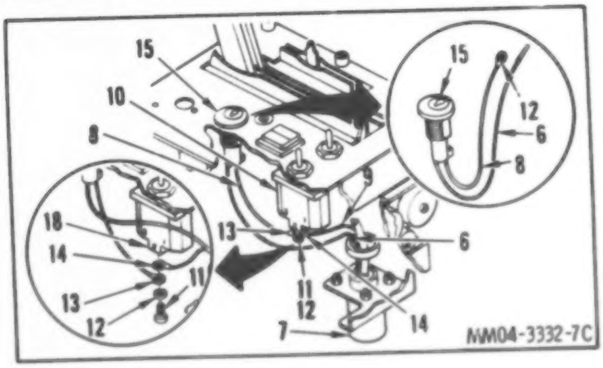
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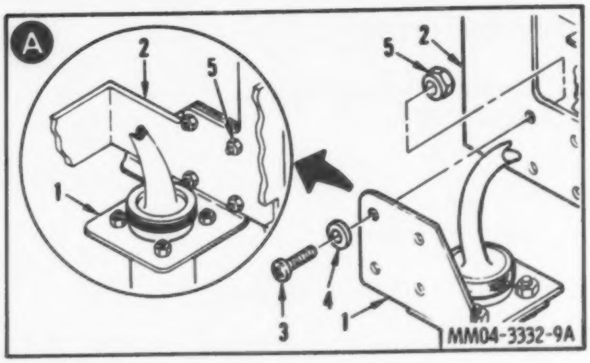
4-8-43. PILOT POWER QUADRANT PANEL - IGNITION LOCK SWITCH REMOVAL/INSTALLATION (AVIM) (cont) 4-8-43



6. **Install bracket (1) onto panel (2).**

   a. Install four washers (4), screws (3), and lock nuts (5).

7. **Inspect (TI).**

8. **Install pilot power quadrant edge lighted panel** (para 4-8-39).

9. **Install pilot power quadrant panel** (para 4-8-21).

10. **Perform power plant operational check (engine 1 and engine 2)** (TM 55-1520-238-T).

END OF TASK

4-8-44. PILOT POWER QUADRANT PANEL - ENG NO. 1 INTERLOCK SWITCH REMOVAL/INSTALLATION (AVIM) 4-8-44

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915

Materials/Parts:

	Wire cap (2)
(E119)	Compound, Sealing

Personnel Required:

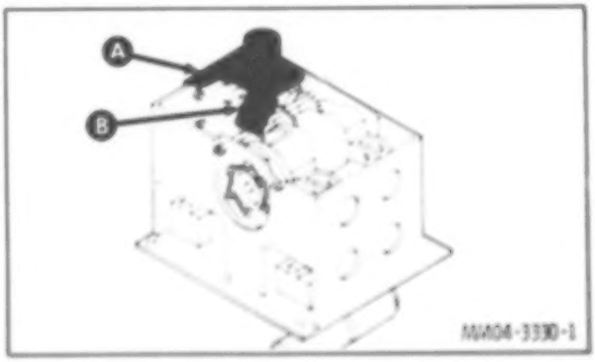
68F10	Aircraft Electrician
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T
TM 55-1500-323-24

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-8-20	Pilot power quadrant removed
4-8-38	Pilot power quadrant indicating light panel removed

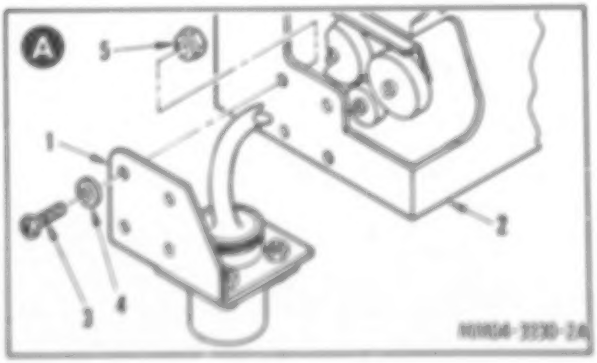


A. REMOVAL

1. Remove bracket (1) from panel (2).

   a. Remove four screws (3), washers (4), and lock nuts (5).

   b. Remove tiewraps as required.



GO TO NEXT PAGE

5-2-7. MAIN ROTOR BLADE DEBONDED DOUBLER OR SPAR REPAIR (cont) 5-2-7

B. SPAR REPAIR

1. **Tap edge of a coin held between thumb and forefinger on blade (1) and spar (7).** A bonded spot will have a sharp ring. An unbonded spot will have a dull sound.

2. **Mark area of spar (7) to be repaired.** Use china marker.

3. **Sand spanwise to remove paint from debonded spar (7) and surrounding area by sanding in a spanwise direction.** Use abrasive paper (E20).

4. **Sand spanwise to finish sand spar (7) surface.** Use abrasive paper (E21).

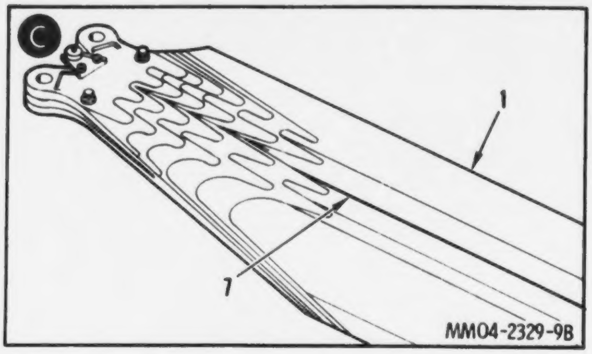
5. **Lift debonded spar (7) just high enough to remove existing loose adhesive.** Scuff sand both surfaces. Use abrasive paper (E20) and (E21).

6. **Remove loose scale, chips, and dust from between mating surfaces of rotor blade (1) and debonded spar (7).**

WARNING

Trichloroethane is highly toxic. Use in well ventilated area. Breathing vapors could cause dizziness. If trichloroethane comes in contact with eyes or skin, flush with water. If trichloroethane comes in contact with eyes or dizziness occurs, seek medical aid.

7. **Clean mating surfaces between rotor blade (1) and debonded spar (7).** Use brush (E68) and trichloroethane (E39). Wear goggles, gloves, and apron. Discard brush in suitable container.



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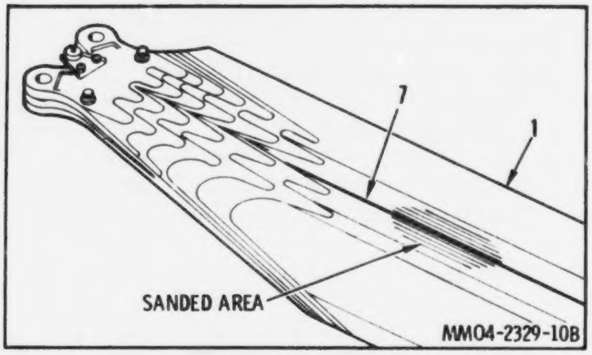

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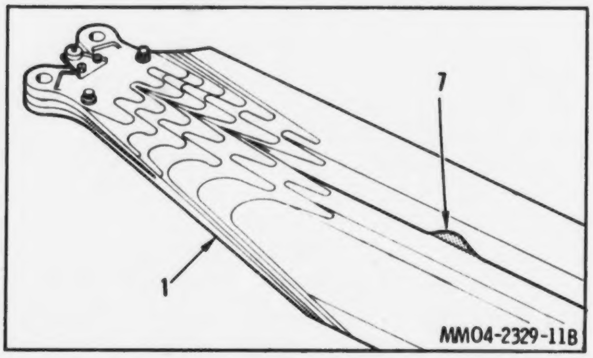

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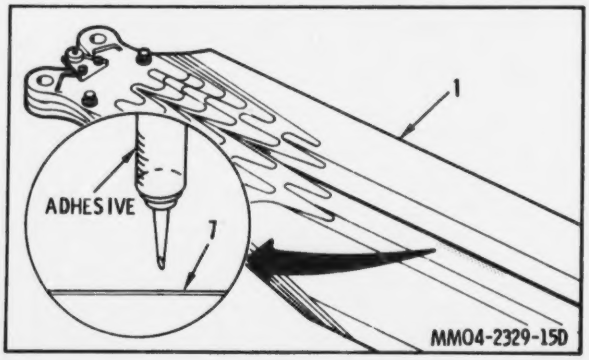

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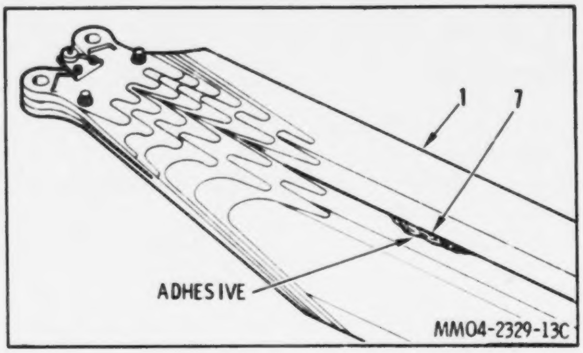
5-2-7. MAIN ROTOR BLADE DEBONDED DOUBLER OR SPAR REPAIR (AVIM) (cont) 5-2-7

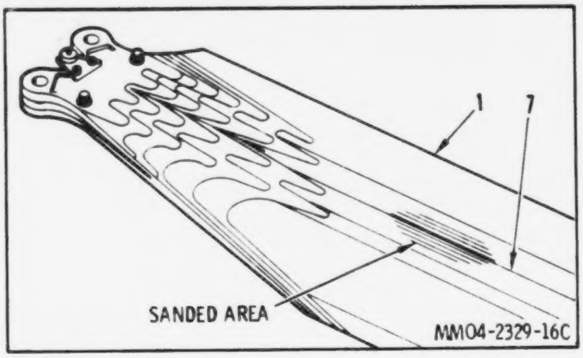
8. Inject mixed adhesive (E67) between mating surfaces of rotor blade (1) and debonded spar (7). Use syringe.

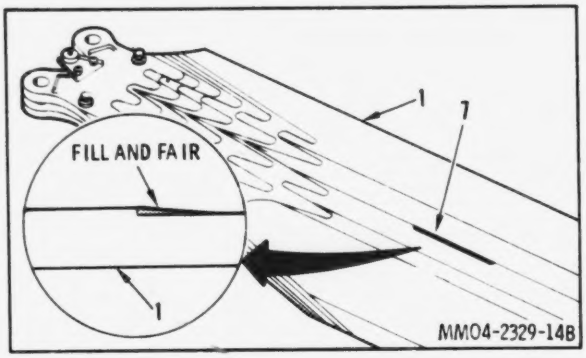
9. Press debonded spar (7) against rotor blade (1). Apply only necessary pressure to hold spar (7) against rotor blade (1).

10. Wipe excess adhesive from rotor blade (1).

11. Allow adhesive to cure at room temperature for 24 hours.







WARNING

Trichloroethane is highly toxic. Use in well ventilated area. Breathing vapors could cause dizziness. If trichloroethane comes in contact with eyes or skin, flush with water. If trichloroethane comes in contact with eyes or dizziness occurs, seek medical aid.

12. Wipe rotor blade clean. Use cheesecloth (E31), and trichloroethane (E39). Wear goggles, gloves, and apron.

13. Check repaired debonded spar (7). Tap a coin held between thumb and forefinger on rotor blade (1). A bonded spot will have a sharp ring. An unbonded spot will have a dull sound.

14. Fill and fair cavity between rotor blade (1) and repaired spar (7). Use epoxy compound (E60).

15. Allow epoxy compound to dry at room temperature 24 hours.

16. Spot prime and paint blade (1) repair and surrounding area (TM 55-1500-345-23).

17. Inspect (TI).

END OF TASK

5-2-8. MAIN ROTOR BLADE SCRATCH, NICK, OR GOUGE REPAIR 5-2-8

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Airframe Repairer's	5180-00-323-4876
Gloves, Rubber	8415-00-266-8677
Apron, Impermeable	8415-00-082-6108
Goggles	4240-00-203-0317
Gun, Spray	4940-00-261-8413
Cup, Gun, Spray	4940-00-190-5164
Respirator, Air Filtering	4240-00-022-2524
Gage, Depth, Dial Indicating	5120-00-710-4359

Materials/Parts:

(E19) Primer
(E20) Abrasive Paper
(E21) Abrasive Paper
(E39) Trichloroethane
(E64) Polyurethane Coating, Black

Personnel Required:

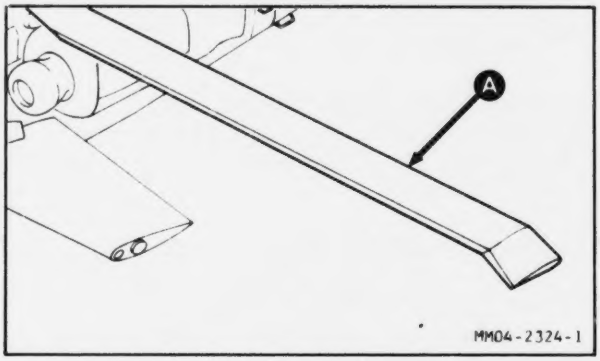
68G10 Aircraft Structural Repairer
66R30 Inspector/Supervisor

References:

TM 55-1520-238-T
TM 55-1500-345-23

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



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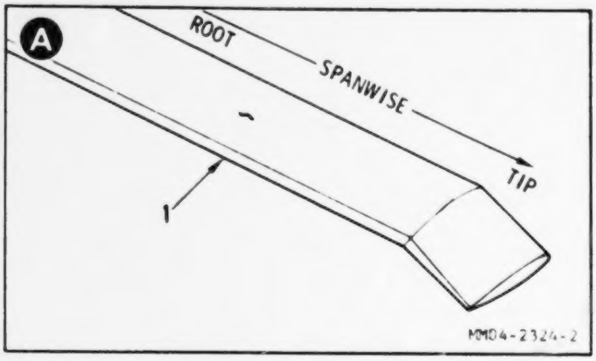
5-2-8. MAIN ROTOR BLADE SCRATCH, NICK, OR GOUGE REPAIR (cont) 5-2-8

CAUTION

Spanwise sanding applies to the metallic area only. The glass skinned area should be sanded in a chordwise direction.

1. **Remove scratches, nicks, or gouges from main rotor blade (1) by locally sanding damaged area in appropriate direction.** Blend and feather damage into surrounding area. Use abrasive paper (E20).

2. **Remove any remaining sanding marks and finish blending damaged area by sanding in appropriate direction.** Use abrasive paper (E21).



WARNING

Trichloroethane is highly toxic. Use in well ventilated area. Breathing vapors could cause dizziness. If trichloroethane comes in contact with eyes or skin, flush with water. If trichloroethane comes in contact with eyes or dizziness occurs, seek medical aid.

3. **Wipe reworked area clean.** Use trichloroethane (E39). Wear goggles, gloves, and apron.

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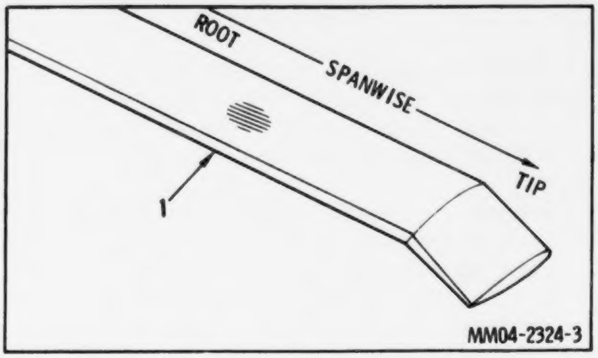
5-2-8. MAIN ROTOR BLADE SCRATCH, NICK, AND GOUGE REPAIR (cont) 5-2-8



4. Inspect repaired area.

   a. Check that all damage is removed and no sanding marks remain.

   b. Check that depth of repair does not exceed limits of table 1 (para 5-2-2). Use depth gage.

WARNING

Polyurethane is flammable and toxic to eyes, skin, and respiratory tract. Skin and eye protection are required. Avoid repeated or prolonged exposure. Good general ventilation is adequate.

5. Refinish reworked area.

   a. Spray a full, even coat of primer (E19) on reworked area being sure to feather primer into existing painted surfaces. Use spray gun and paint cup (TM 55-1500-343-23). Wear respirator.

   b. Allow primer to air dry for at least one hour.

   c. Spray a full, even coat of polyurethane coating on reworked area being sure to feather edges into the existing surfaces. Use spray gun and paint cup (TM 55-1500-345-23). Wear respirator.

   d. Allow polyurethane (E64) to air dry at least 3 hours.

6. Inspect (TI).

7. **Perform main rotor track and balance - operational check** (TM 55-1520-238-T).

END OF TASK

5-2-9. MAIN ROTOR BLADE PAINT EROSION TOUCHUP 5-2-9

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Airframe Repairer's	5180-00-323-4876
Gloves, Rubber	8415-00-266-8677
Apron, Impermeable	8415-00-082-6108
Goggles	4240-00-052-3776
Gun, Spray	4940-00-261-8413
Cup, Gun, Spray	4940-00-190-5164
Respirator, Air Filtering	4240-00-022-2524

Materials/Parts:

(E19)	Primer
(E22)	Methyl Ethyl Ketone
(E64)	Polyurethane, Black
(E75)	Abrasive Cloth

Personnel Required:

68G10	Aircraft Structural Repairer
66R30	Inspector/Supervisor

References:

TM 55-1500-345-23

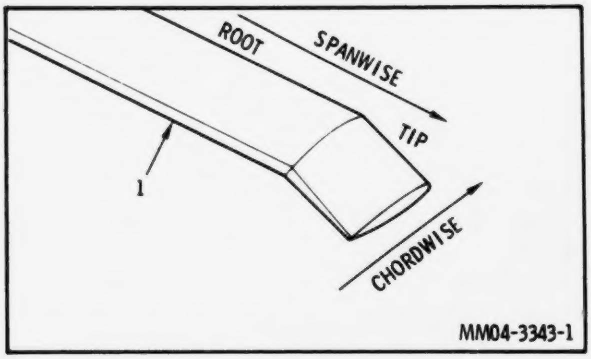
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

CAUTION

Sand metallic surfaces in a spanwise direction. Sand glass skin areas aft of the No. 4 spar in a chordwise direction to prevent damage to the reverse direction of glass fibers.

1. **Remove all loose and non-adhering paint from area to be touched-up on main rotor blade (1).** Feather edges of repair area. Use abrasive cloth (E75).



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WARNING

- MEK is highly flammable and toxic. Use in a well ventilated area away from open flames. Breathing vapors could cause dizziness. If MEK comes in contact with eyes or skin, flush with water. If MEK comes in contact with eyes, or dizziness occurs, seek medical aid.
- Primer and polyurethane are flammable and toxic to eyes, skin, and respiratory tract. Avoid repeated or prolonged contact. Use respirator, goggles, apron, and rubber gloves. Breathing vapors could cause dizziness. If primer comes in contact with eyes or skin, or dizziness occurs, seek medical aid.

2. **Wipe sanded areas clean.** Allow surface to dry not less than 15 minutes or until no solvent odor is noticeable before applying primer (TM 55-1500-345-23). Use MEK (E22). Wear respirator, goggles, apron, and rubber gloves.
3. **Apply primer by spraying full wet coats to produce a dry film to a thickness of 0.8 to 1.2 mils.** Use primer (E19), paint cup, and spraygun. Wear respirator.
4. **Allow primer dry film to dry not less than 1 hour nor more than 48 hours before application of topcoat.**
5. **Apply topcoat of polyurethane by spraying full wet coats to produce a dry film thickness of 1.8 to 3.0 mils dry film** (TM 55-1500-345-23). Use polyurethane coating (E64), paint cup, and spraygun. Wear respirator.
6. **Topcoat will dry to touch in 30 minutes and dry hard in 3 hours.**

NOTE

Main rotor blade rebalance is not necessary if steps 1 thru 6 are performed.

END OF TASK

5-2-10. MAIN ROTOR BLADE LEADING EDGE TIP REPLACEMENT (AVIM) 5-2-10

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Bit, Screwdriver	5130-01-009-1219
Brush	8020-00-260-1305

Materials/Parts:

(E39) Trichloroethane

Personnel Required:

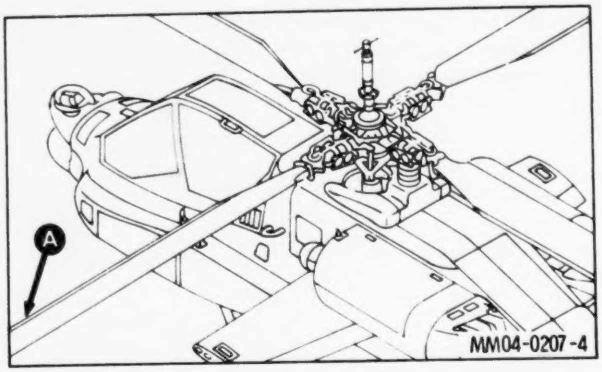
67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1500-204-25/1

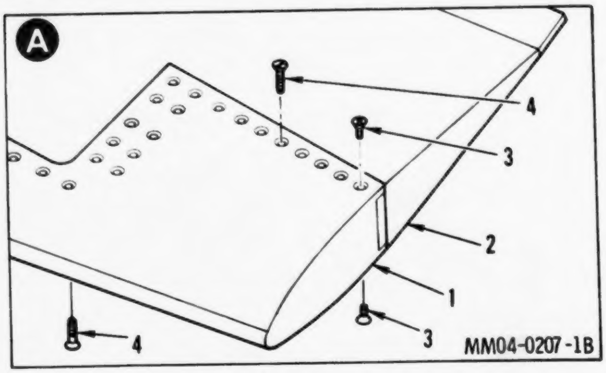
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



A. REMOVAL

1. **Remove main rotor blade leading edge tip (1) from main rotor blade (2).**
   a. Remove 21 screws (3) and 3 screws (4) from tip (1) upper surface. Use screwdriver bit.
   b. Remove 21 screws (3) and 2 screws (4) from tip (1) lower surface. Use screwdriver bit.
   c. Pull tip (1) from blade (2).



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B. CLEANING

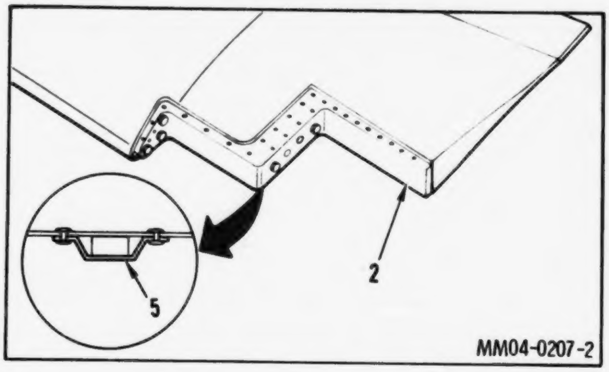
WARNING

Trichloroethane is highly toxic. Use in well ventilated area. Breathing vapors could cause dizziness. If trichloroethane comes in contact with eyes or skin, flush with water. If trichloroethane comes in contact with eyes or dizziness occurs, seek medical aid.

Wipe main rotor blade leading edge tip faying surface clean (para 1-5-36).

C. INSPECTION

1. Check main rotor blade leading edge tip faying surface for cracks, wear, and chafing. None allowed.
2. Check 47 nut plates for loose and missing rivets, or damaged threads. (TM 55-1500-204-25/1).
3. Check tip cap doublers for debonding. None allowed.



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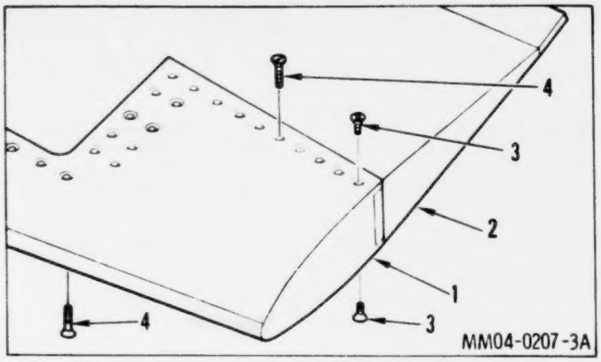
D. INSTALLATION



1. **Install tip (1) on main rotor blade (2).** Torque screws (3) and (4) to **45 INCH-POUNDS.**

   a. Install tip (1) on blade (2) with screw holes alined.

   b. Install 21 screws (3) and 3 screws (4) on tip (1) upper surface. Use screwdriver bit.

   c. Install 21 screws (3) and 2 screws (4) on tip (1) lower surface. Use screwdriver bit.

   d. Torque screws (3) and (4) to **45 INCH-POUNDS.**

   e. Fill and fare as required. Use (E60).

2. **Inspect (TI).**

3. **Perform main rotor track and balance operational check** (TM 55-1520-238-T).

END OF TASK

5-2-11. MAIN ROTOR HEAD REMOVAL 5-2-11

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Kit, Airframe Adapter	1730-01-240-6743
Kit, Sling Set	1730-01-246-6781

Personnel Required:

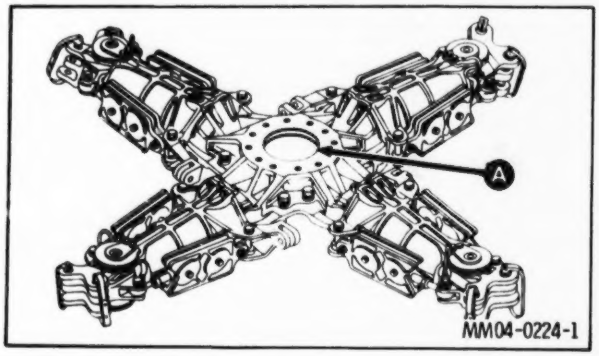
67R10 Attack Helicopter Repairer (2)
One to assist

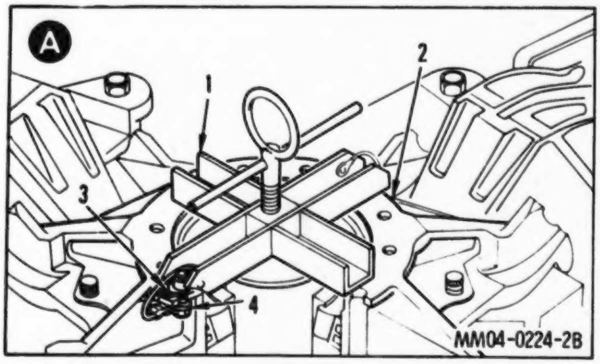
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
1-7-42	Aircraft mounted maintenance crane installed
5-2-4	Main rotor blades removed
6-3-41	Main rotor gearshaft removed
11-3-45	Main rotor blade pitch links disconnected
11-3-40	Main rotor scissor disconnected
5-2-13	Main rotor hub nut removed

WARNING

Main rotor head weighs approximately 600 pounds. Use crane to lift rotor head. Failure to do so could result in serious injury. If injury occurs, seek medical aid.





A. REMOVAL

1. **Attach puller/sling (1) to main rotor head (2).**
   - a. Position puller/sling (1) on top of head (2).
   - b. Aline support nut plates (3) in sling with bolt holes in head (2).
   - c. Install two captive bolts (4) through head (2) into nut plates (3).
   - d. Tighten two bolts (4).

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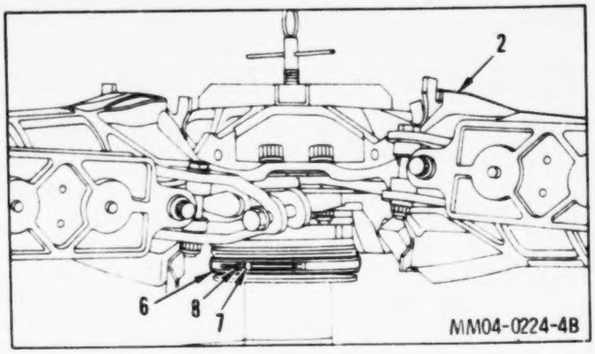
2. **Install bearing retainer (6).**

   a. Install retainer (6) in bottom groove of head (2).

   b. Close retainer (6). Engage quick coupler (7).

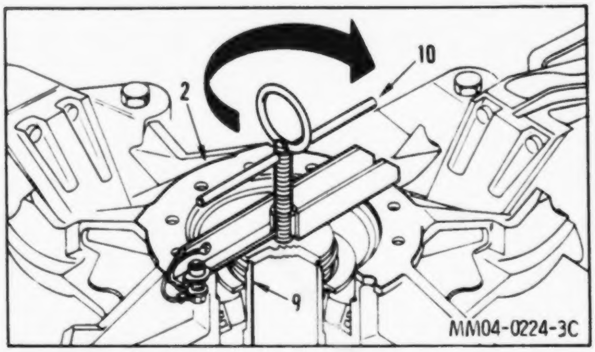
   c. Tighten nut (8).



3. **Break head (2) loose from mast (9).**

   a. Turn jack handle (10) of sling (1) clockwise until jack plate contacts mast (9).

   b. Continue to turn handle (10) until head (2) is loose from mast (9).

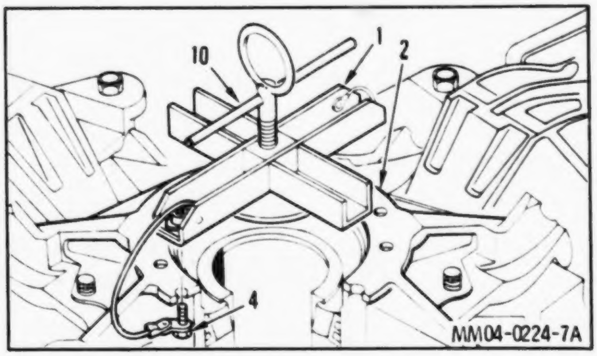


4. **Remove head (2) from mast (9)** (para 1-7-30).

5. **Remove puller/sling (1) from main head (2).**

   a. Remove two bolts (4) from puller/sling.

   b. Pulling straight up on jack handle (10), remove puller/sling (1).



B. **CLEANING**

Clean main rotor head and mast (para 1-5-36).

C. **INSPECTION**

1. **Check main rotor head for scratches, and scoring.** Maximum depth not to exceed 0.010 inch.

2. **Check mast for scratches, scoring, and thread damage.** Max depth not to exceed thickness of silver plating.

3. **Check main rotor head for corrosion** (para 1-5-38).

4. **Check main rotor head and mast for cracks.** None allowed.

END OF TASK

5-2-12. MAIN ROTOR HEAD INSTALLATION 5-2-12

Tools:

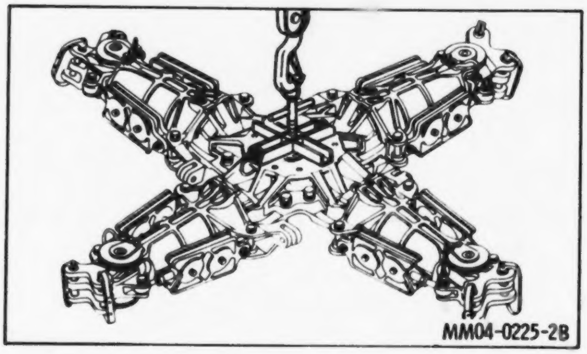
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

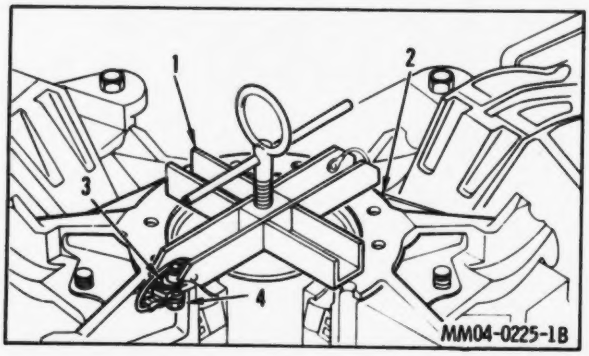
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
1-7-42	Maintenance crane installed

Personnel Required:

67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor





1. **Attach puller/sling (1) to main rotor head (2).**
    a. Position puller/sling (1) on top of head (2).
    b. Aline support nut plates (3) in sling (1) with bolt holes in head (2).
    c. Install two captive bolts (4) through head (2) into plates (3).
    d. Tighten two bolts (4).

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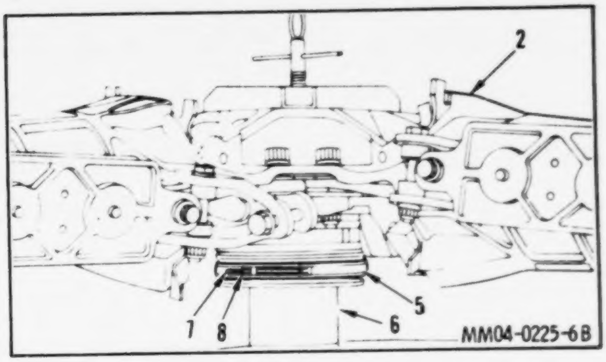
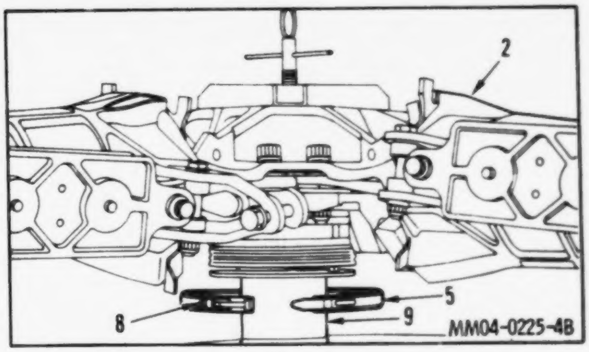
5-2-12. MAIN ROTOR HEAD INSTALLATION (cont) 5-2-12

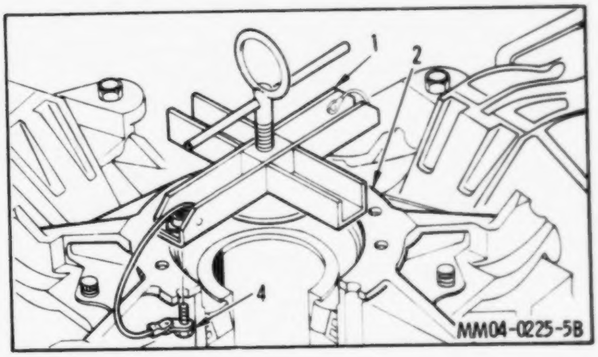
2. **Install bearing retainer (5).**
   - a. Lift head (2) half way from mount fixture (6).
   - b. Install retainer (5) in bottom groove of head (2).
   - c. Close retainer (5) to engage quick coupler (7). Tighten nut (8).



3. **Install head (2) on mast (9)** (para 1-7-31).
4. **Remove retainer (5).**
   - a. Loosen nut (8). Remove retainer (5).
   - b. Lower head (2) until seated on mast (9).



5. **Remove puller/sling (1) from head (2).**
   - a. Remove two bolts (4) from puller/sling (1).
   - b. Pulling straight up, remove puller/sling (1) from rotorhead (2).



6. **Inspect (TI).**
7. **Install main rotor hub retention nut** (para 5-2-14).
8. **Connect main rotor scissor** (para 11-3-40).
9. **Connect main rotor pitch links** (para 11-3-45).
10. **Install main rotor gear shaft** (para 6-3-42).
11. **Install main rotor blades** (para 5-2-5).
12. **Remove maintenance crane** (para 1-7-50).
13. **Perform main rotor blade phase adjustment** (para 5-2-38).

END OF TASK

5-2-13. MAIN ROTOR HUB RETENTION NUT REMOVAL 5-2-13

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

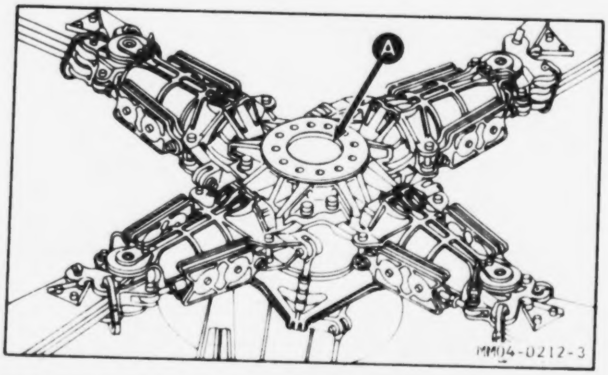
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

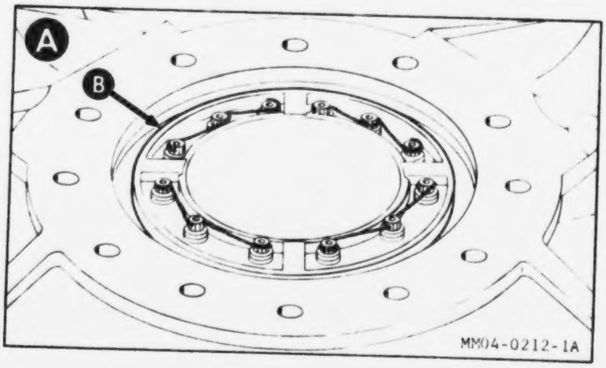
Personnel Required:

67R10 Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
6-3-38	Drive plate cover removed
6-3-42	Main rotor drive plate removed





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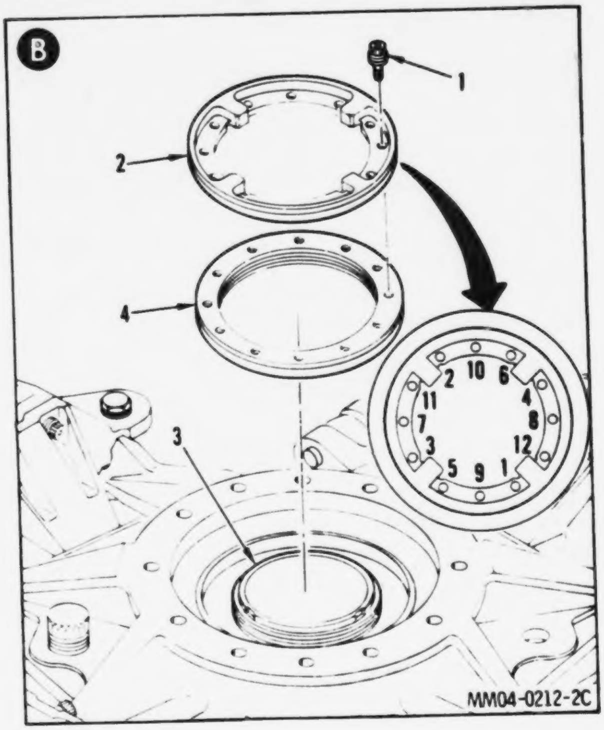
5-2-13. MAIN ROTOR HUB RETENTION NUT REMOVAL (cont) 5-2-13

A. REMOVAL

1. **Remove 12 lockring bolts (1).**
   - a. Remove lockwire from bolts (1).
   - b. Remove bolts (1) from lockring (2) in the following order: **12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1.**
2. **Remove lockring (2) from mast (3).**
3. **Remove main rotor hub nut (4) (turn clockwise).**
   - a. Install two bolts (1) in nut (4) **180 degrees** apart.
   - b. Remove nut (4) from mast (3). Use two bolts (1) as handles to turn nut (4) clockwise.
   - c. Remove bolts (1) from nut (4).



B. CLEANING

Clean lockring, hub nut, and 12 bolts (para 1-5-36).

C. INSPECTION

1. **Check lockring and hub nut for cracks.** None allowed.
2. **Check lockring and hub nut for nicks, gouges, scratches, scoring, and galling.** Defects shall not exceed 0.010 inch width, 0.010 inch depth and 1.00 inch length.
3. **Check bolts, mast, and hub nut for thread damage.** None allowed.

END OF TASK

5-2-14. MAIN ROTOR HUB RETENTION NUT INSTALLATION 5-2-14

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 3/8 Drive	5120-00-288-8865
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Materials/Parts:

(E14)	Thread Lubricant
(E15)	Lockwire

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

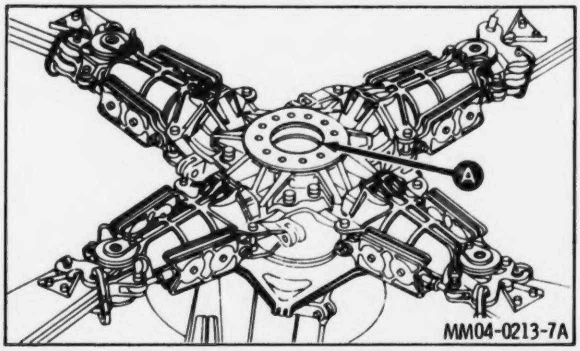
TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
5-2-4	Main rotor blades removed
6-3-35	Main rotor de-ice distributor and ADS mast assembly removed
11-3-48	Pitch links removed

CAUTION

To prevent damage to main rotor mast, do not move rotor during this task.



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5-2-14. MAIN ROTOR HUB RETENTION NUT INSTALLATION (cont) 5-2-14

1. **Install main rotor hub nut (1).** Install hub nut (1) on mast (2). Hand tighten hub nut.
2. **Install lockring (3).**
   a. Aline tangs on lockring (3) with slot on mast (2).
   b. Place lockring (3) on top of hub nut (1). Aline holes. If holes in lockring (3) do not aline with holes in hub nut (1), loosen hub nut (1) until alinement is obtained.
3. **Install 12 bolts (4).**

NOTE

Allow bolts to dry for 6 hours after coating with lubricant.

   a. Coat bolts with lubricant (E14).
   b. Install 12 bolts (4) through lockring (3) and hub nut (1).
   c. Tighten 12 bolts (4) until they bear lightly against retainer (5).
4. **Torque 12 bolts (4) in the following order: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.** Bolt holes are identified on ring (3).
   a. Torque 12 bolts (4) to **90 INCH-POUNDS.** Use 1/4 drive torque wrench.
   b. Torque 12 bolts (4) to **225 INCH-POUNDS.** Use 3/8 drive torque wrench.
   c. Torque 12 bolts (4) to **315 INCH-POUNDS.** Use 3/8 drive torque wrench.
5. **Remove and reinstall lockring (3).**
   a. Remove 12 bolts (4) in reverse order starting with No. 12.
   b. Remove lockring (3).

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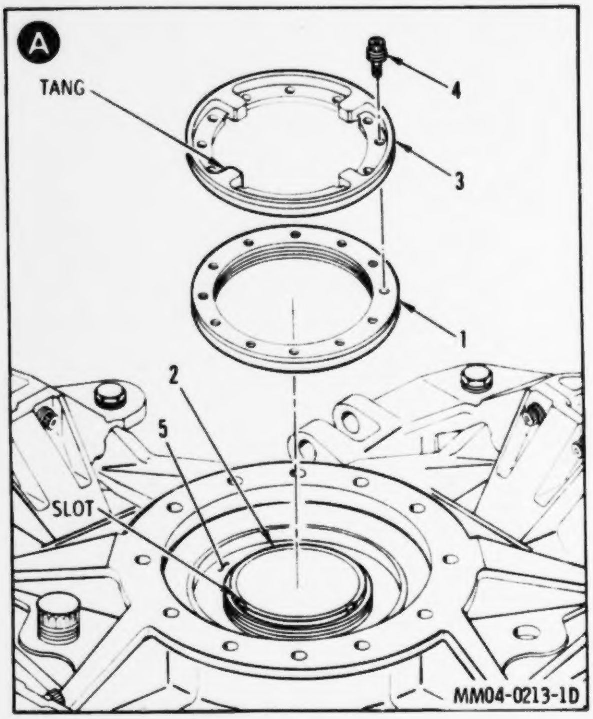
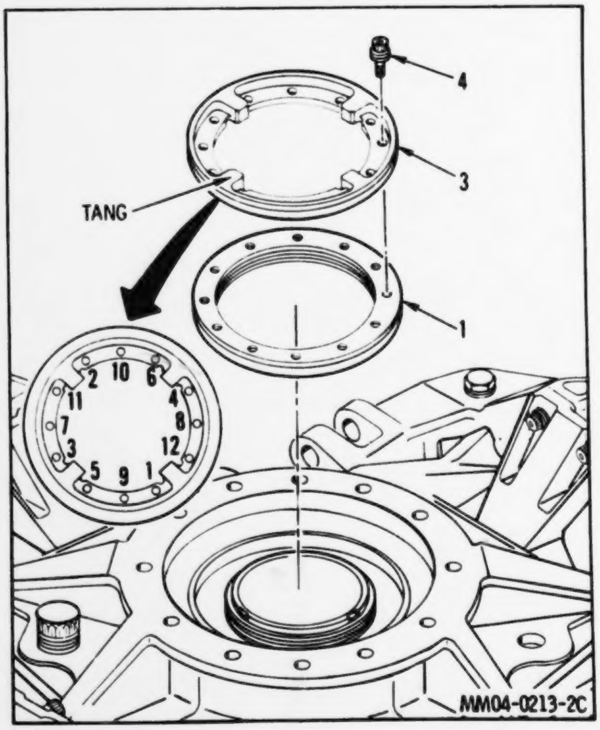




5-2-14. MAIN ROTOR HUB RETENTION NUT INSTALLATION (cont) 5-2-14

c. Hand tighten hub nut (1).

d. Install lockring (3).

e. Aline tangs on lockring (3) with slots on mast (2).

f. Place lockring (3) on top of hub nut (1). Aline holes. If holes in lockring (3) do not aline with holes in hub nut (1), loosen hub nut (1) until alignment is obtained.

g. Lubricate threads of bolts (4). Use thread lubricant (E14).

NOTE

Allow bolts to dry for 6 hours after coating with lubricant.

h. Install 12 bolts (4) in lockring (3).

i. Torque 12 bolts (4) to **45 INCH-POUNDS.** Use torque sequence from step 4. Use 1/4 drive torque wrench.

j. Torque 12 bolts (4) to **90 INCH-POUNDS.** Use 1/4 drive torque wrench.

k. Torque 12 bolts (4) to **135 INCH-POUNDS.** Use 3/8 drive torque wrench.

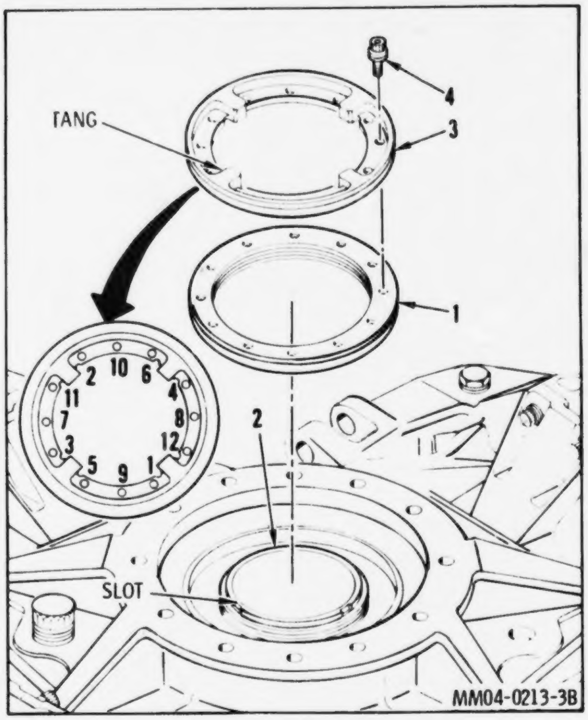
l. Torque 12 bolts (4) to **185 INCH-POUNDS.** Use 3/8 drive torque wrench.

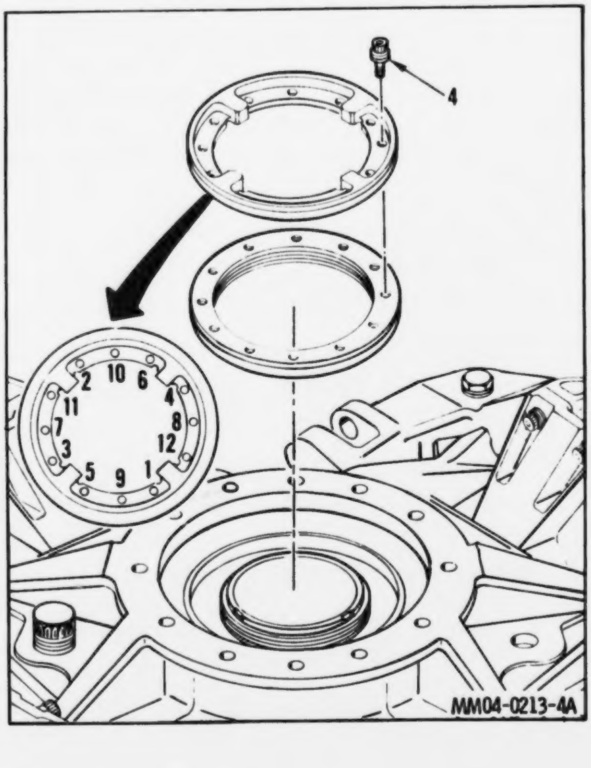
6. **Final torque requirement.**

a. Torque 12 bolts (4) to **225 INCH-POUNDS.** Use torque sequence from step 4. Use 3/8 drive torque wrench.

b. Torque 12 bolts (4) to **225 INCH-POUNDS.**

c. Torque 12 bolts (4) to **225 INCH-POUNDS.**





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5-2-14. MAIN ROTOR HUB RETENTION NUT INSTALLATION (cont) 5-2-14

7. **Ensure that lockring (3) is free and floating under bolt (4) heads.**

NOTE

Repeat steps 3 thru 6 if lockring is not free and floating under bolt heads.

8. **Inspect (TI).**

9. **Lockwire 12 bolts (4) in sets of three.** Use lockwire (E15).

10. **Inspect (TI).**

11. **Install main rotor drive plate** (para 6-3-42).

12. **Install main rotor drive plate cover** (para 6-3-38).

13. **Perform main rotor track and balance operational check** (TM 55-1520-238-T).

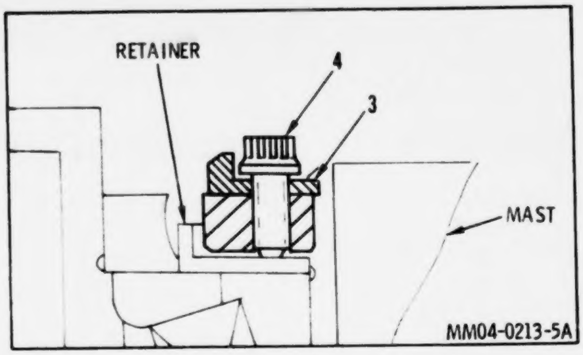
14. **Connect main rotor pitch links** (para 11-3-48).

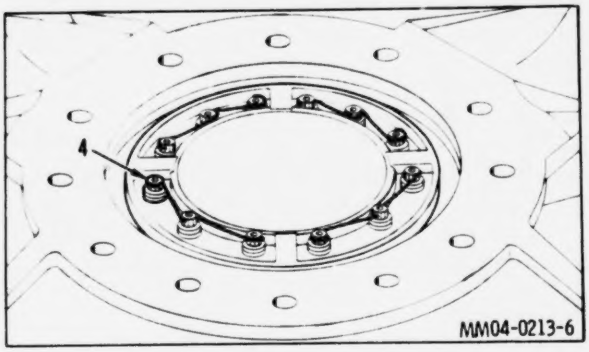
15. **Install main rotor de-ice distributer and air data system** (para 6-3-31).

16. **Install main rotor blades** (para 5-2-4).

17. **Perform main rotor blade phase adjustment** (para 5-2-36).

18. **Perform main rotor track and balance operational check** (TM 55-1520-238-T).





END OF TASK

5-2-15. MAIN ROTOR UPPER SEAL RETAINER AND SEAL REPLACEMENT (AVIM) 5-2-15

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain	5180-00-003-5267
Kit, Upper Seal Removal	7-362100022
Sling Universal	7-262110010
Driftpin	5120-00-239-0036

Materials/Parts:

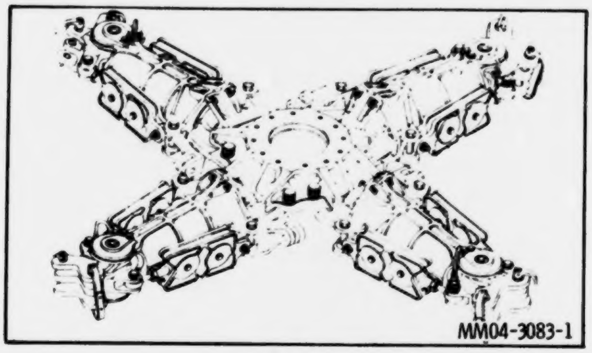
(E5) Grease

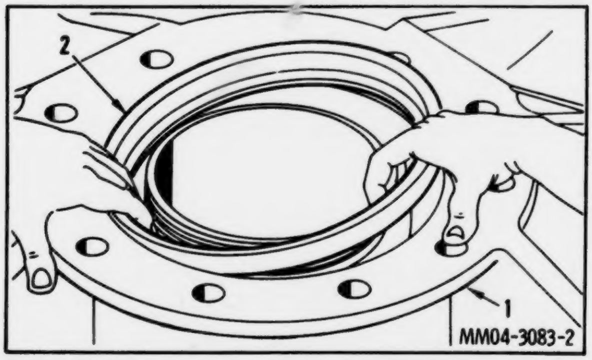
Personnel Required:

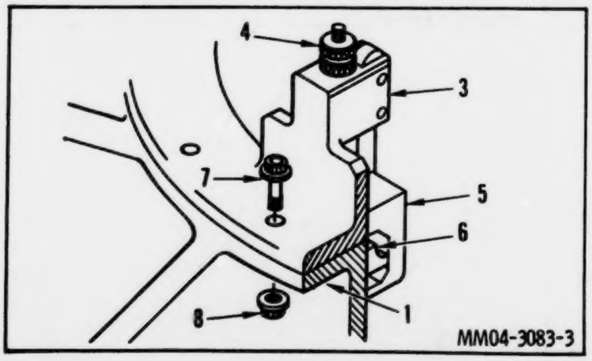
68D10	Aircraft Powertrain Repairer (3) Two to assist
66R30	Inspector/Supervisor

WARNING

Main rotor head weighs approximately 600 pounds. Use crane to position rotor head. If injury occurs, seek medical aid.







A. **REMOVAL**

1. **Position main rotor head (1) right side up on suitable support.** Use universal sling and crane.

2. **Remove main rotor top seal retainer (2).** Pull outward and upward until retainer (2) is free.

3. **Install seal puller (3) on main rotor head (1).**

   a. Loosen five knurled knobs (4).

   b. Position puller (3) on head (1).

   c. Adjust fingers (5) under seal (6). Do not tighten knobs (4) now.

   d. Install 12 bolts (7) and nuts (8) finger tight.

GO TO NEXT PAGE

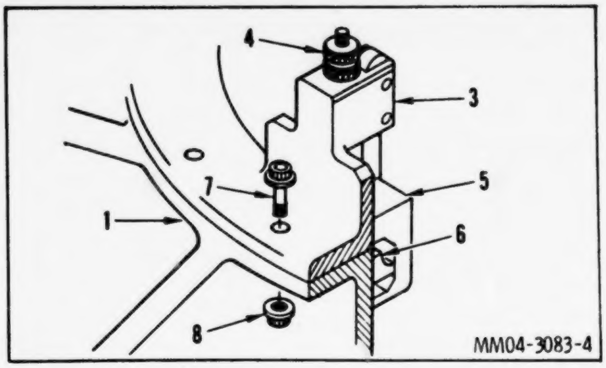
5-2-15. MAIN ROTOR UPPER SEAL RETAINER AND SEAL REPLACEMENT (AVIM) (cont) 5-2-15

4. **Remove upper main rotor seal (6).**

   a. Tighten knobs (4) until fingers (5) bottom on seal (6).

   b. Continue to tighten knobs (4) half turn each time, in sequence illustrated, until seal (6) is removed.

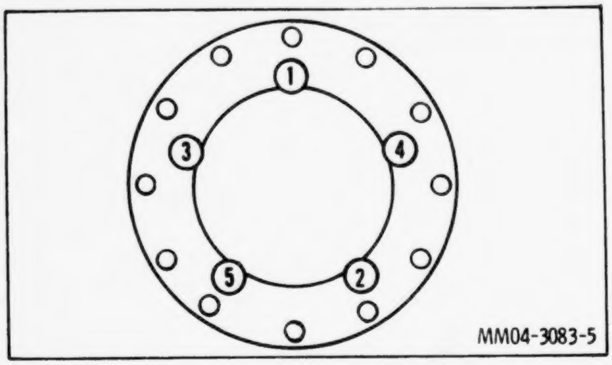
5. **Remove puller (3).** Remove bolts (7) and nuts (8).



MM04-3083-4

B. CLEANING

Remove grease from head (1) and retainer (2) (para 1-5-36).



MM04-3083-5

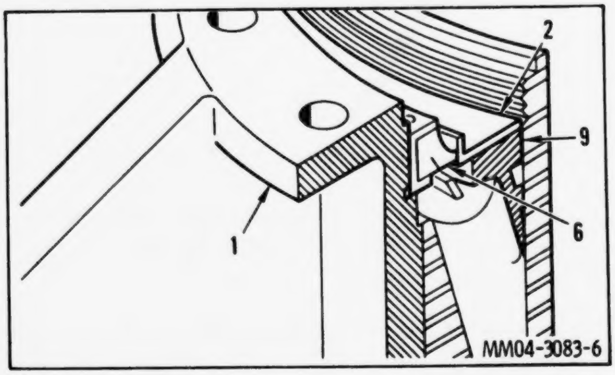
C. INSPECTION

1. **Check main rotor head for nicks, scratches, and gouges.** None allowed.

2. **Check outside diameter of retainer for grooves and nicks.** Blend out, maximum 0.010 inch.

3. **Check head and retainer for corrosion** (para 1-5-38).

4. **Check all components for cracks.** None allowed.



MM04-3083-6

D. INSTALLATION

1. **Pack head (1) with grease to upper surface of bearing inner race (9).**

2. **Install seal (6).**

   a. Position seal (6) against inner wall of head (1).

   b. Tap seal (6) in circular direction until seated in head (1). Use driftpin.

3. **Install retainer (2).** Tap retainer (2) in circular direction until seated in head (1).

END OF TASK

5-2-16. MAIN ROTOR ELECTRICAL LEAD REPLACEMENT 5-2-16

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Materials/Parts:

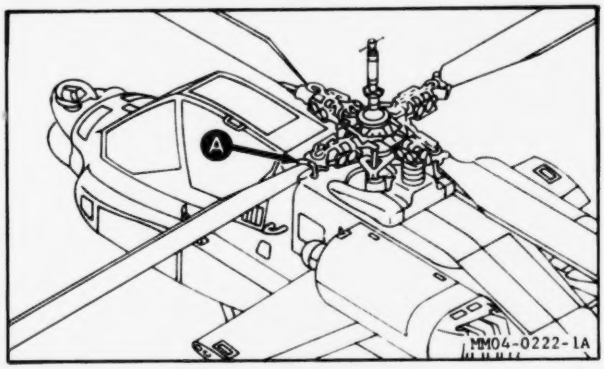
(E14) Thread Lubricant
(E15) Lockwire

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

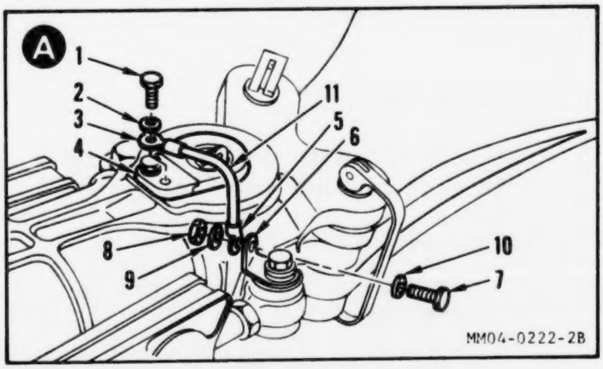
Ref	Condition
1-7-2	Helicopter safed



MM04-0222-1A

A. REMOVAL

1. **Remove lockwire from bolt (1).**
2. **Remove bolt (1), washer (2), and jumper terminal (3) from bearing retainer (4).**
3. **Remove jumper terminal (5) from grounding clip (6).**
   a. Hold bolt (7). Remove nut (8), washer (9), and terminal (5).
   b. Remove bolt (7) and washer (10).
   c. Remove main rotor grounding jumper (11).



MM04-0222-2B

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5-2-16. MAIN ROTOR ELECTRICAL LEAD REPLACEMENT (cont) 5-2-16

B. CLEANING

Wipe retainer and clip with a clean rag.

C. INSPECTION

1. **Check retainer and clip for cracks.** None allowed.

2. **Check retainer and clip for corrosion** (para 1-5-38).

D. INSTALLATION

1. **Install grounding jumper (11).**

    a. Lubricate bolts (1) and (7) and nut (8). Use thread lubricant (E14).

    b. Install terminal (3), washer (2), and bolt (1) on retainer (4).

    c. Install washer (10) and bolt (7) on clip (6).

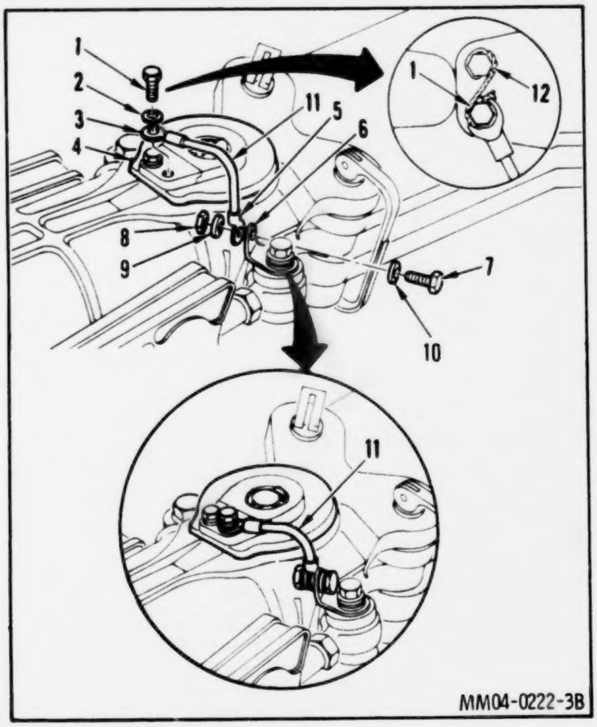
    d. Holding bolt (7), install terminal (5), washer (9), and nut (8).

3. **Hold nut (8).** Torque bolt (7) to **85 INCH-POUNDS.**

4. **Torque bolt (1) to 85 INCH-POUNDS.**

5. **Lockwire bolt (1) to adjacent bolt (12).** Use lockwire (E15).

6. **Inspect (TI).**



END OF TASK

5-2-17. MAIN ROTOR BRUSH AND ELECTRICAL HOLDER REPLACEMENT 5-2-17

This task covers: A. REMOVAL B. INSPECTION C. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-003-5267

Materials/Parts:

(E15) Lockwire

Personnel Required:

68D10 Aircraft Powertrain Repairer
66R30 Inspector/Supervisor

Equipment Conditions:

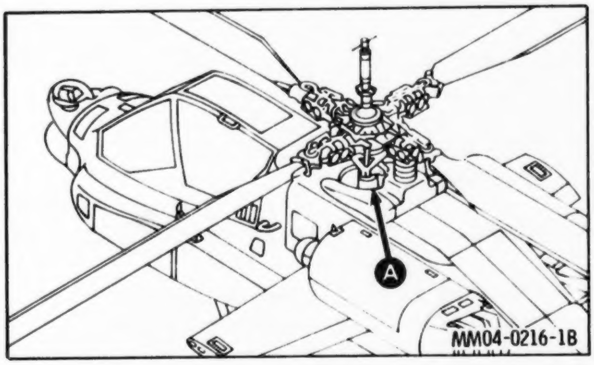
Ref	Condition
1-7-2	Helicopter safed

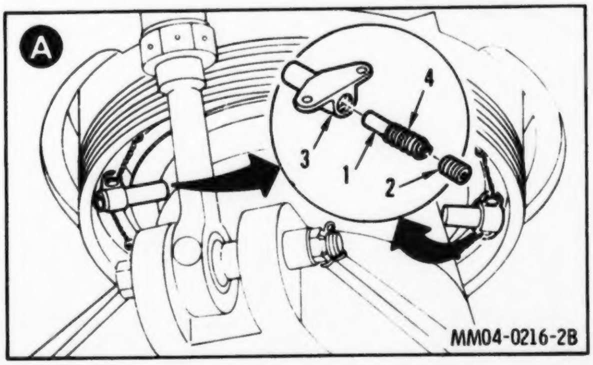
NOTE

- The brushes and brush holders can be replaced separately or together.
- Check that brush makes full contact with mast. If brush does not contact mast, replace brush.

A. REMOVAL

1. **Remove ground brush (1).**
   a. Remove setscrew (2) from brush holder (3).
   b. Remove brush (1) and spring (4) from holder (3).





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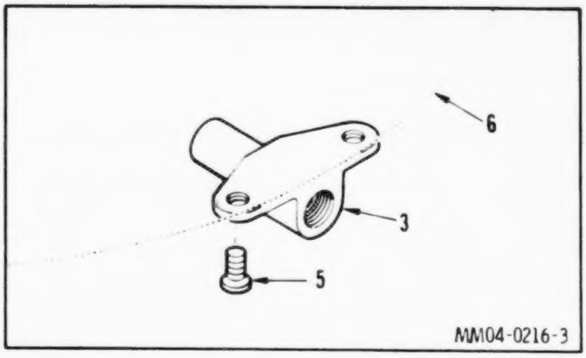
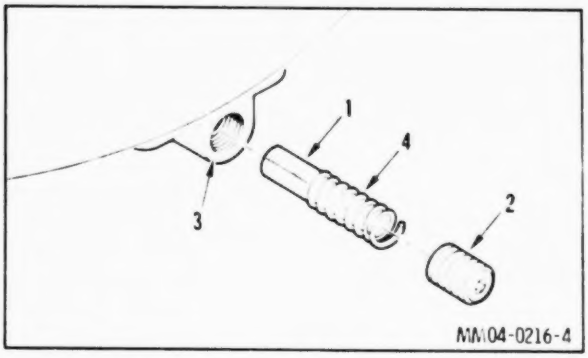
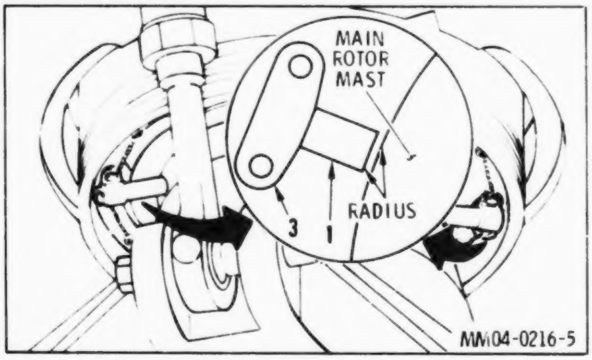
5-2-17. MAIN ROTOR BRUSH AND ELECTRICAL HOLDER REPLACEMENT (cont) 5-2-17







2. Remove brush holder (3).

a. Remove lockwire from two screws (5).

b. Remove two screws (5).

c. Remove holder (3) from seal retainer (6).

B. INSPECTION

If spring is broken or if brush is less than 1/8 INCH long, replace brush and spring.

C. INSTALLATION

1. Install brush holder (3).

a. Position holder (3) on retainer (6).

b. Install two screws (5).

c. Lockwire two screws (5). Use lockwire (E15).

2. Install ground brush (1).

NOTE

If reinstalling a used static brush, ensure radius of brush tip alines with radius of mast edge. Misalinement will cause excessive static in the communication system.

a. Install ground brush (1) and spring (4) in holder (3).

b. Install setscrew (2) in holder (3).

c. Tighten setscrew (2) until outer edge of setscrew (2) is flush with holder (3).

3. Inspect (TI).

END OF TASK

5-2-18. MAIN ROTOR STRIKER PLATE REMOVAL/INSTALLATION 5-2-18

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-003-5267
Wrench, Torque 3/8 Drive	5120-00-821-3441
Kit, Sling Set	1730-01-246-6781

Materials/Parts:

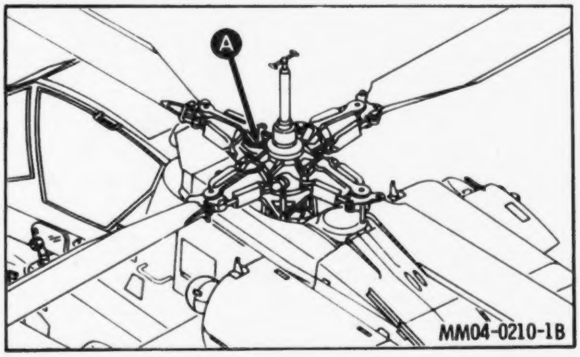
(E14)	Thread Lubricant
(E15)	Lockwire

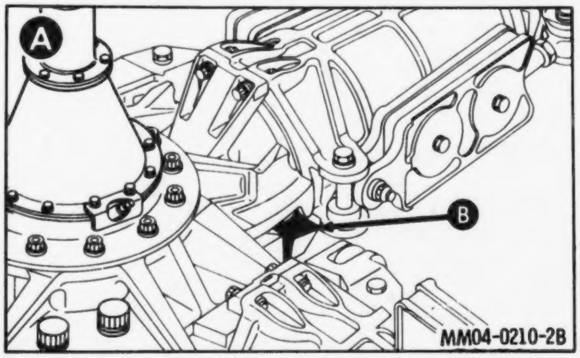
Personnel Required:

68D10 Aircraft Powertrain Repairer (2)
One to assist

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
1-7-28	Droop stop wedges installed
1-7-29	Main rotor blade raised
1-7-42	Maintenance crane installed





NOTE

This task is typical for all four striker plates.

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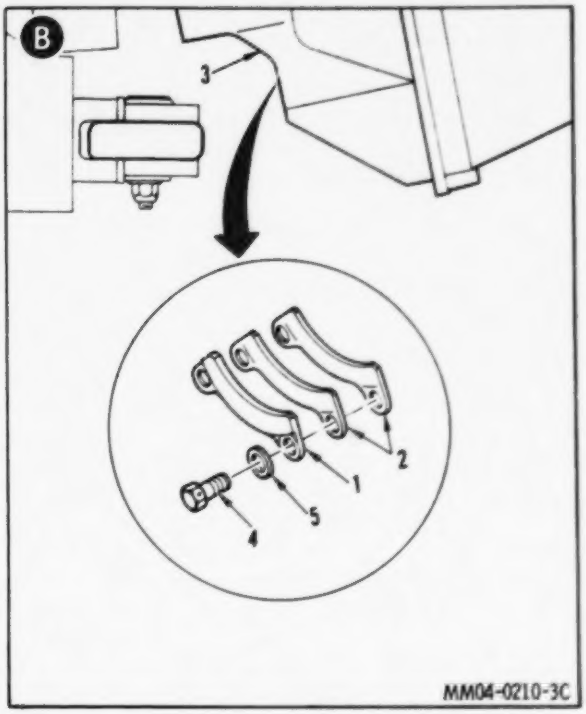
5-2-18. MAIN ROTOR STRIKER PLATE REMOVAL/INSTALLATION (cont) 5-2-18



A. REMOVAL

1. **Remove main rotor striker plate (1) and shim(s) (2) from feathering bearing housing (3).**

   a. Remove lockwire from two bolts (4).

   b. Remove two bolts (4) and two washers (5).

NOTE

Place hand under striker plate to prevent shim(s) from falling when striker plate is removed.

B. CLEANING

Clean striker plate and feathering bearing housing with clean rag.

C. INSPECTION

1. **Check striker plate, shims, and feathering bearing housing for cracks.** None allowed.

2. **Check striker plate for dents or gouges.** Maximum depth not to exceed 0.030 inch.

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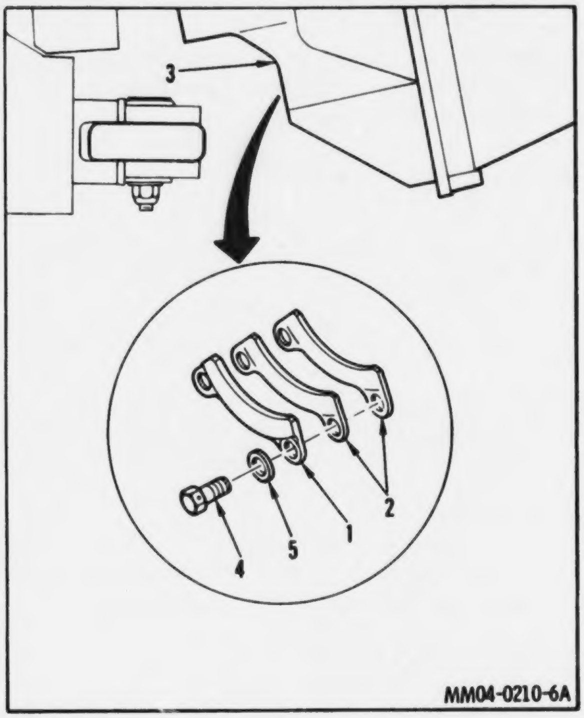
5-2-18. MAIN ROTOR STRIKER PLATE REMOVAL/INSTALLATION (cont) 5-2-18

B. INSTALLATION



1. **Install main rotor striker plate (1) and shim(s) (2) on feathering bearing housing (3).** Torque two bolts (4) to 270 INCH-POUNDS.

NOTE

Maximum allowable number of shims is 6.

   a. Lubricate two bolts (4). Use thread lubricant (E14).

   b. Position shim(s) (2) and striker plate (1) on housing (3) with holes alined.

   c. Install two washers (5) and bolts (4).

   d. Torque two bolts (4) to 270 INCH-POUNDS.

   e. Lockwire two bolts (4). Use lockwire (E15).

2. **Lower main rotor blade** (para 1-7-29).

3. **Measure main rotor blade droop angle** (para 5-2-30).

4. **Remove droop stop wedges** (para 1-7-28).

5. **Remove maintenance crane** (para 1-7-50).

6. **Inspect (TI).**

END OF TASK

5-2-19. MAIN ROTOR DAMPER ROD END REMOVAL/INSTALLATION 5-2-19

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, 1-1/16 & 1-1/8 Box	5120-00-228-9521
Wrench, Torque, 3/8 Drive	5120-00-821-3441
Wrench, Torque, 1/2 Drive	5120-00-270-3121
Crowfoot Attachment, 1-3/8, 1/2 Drive	5120-00-181-6757

Materials/Parts:

(E14) Solid Film Lubricant
(E15) Lockwire
(E54) Preservative

Personnel Required:

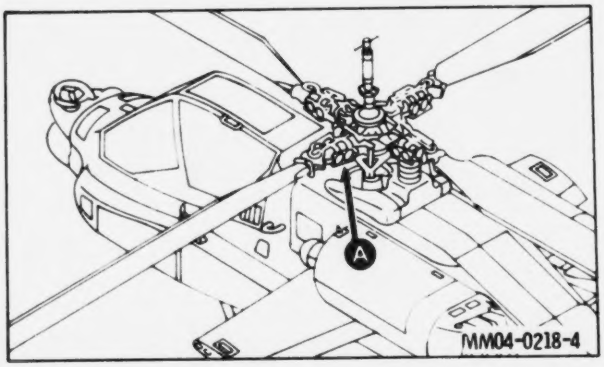
67R10 Attack Helicopter Repairer
66R30 Inspector/Supervisor

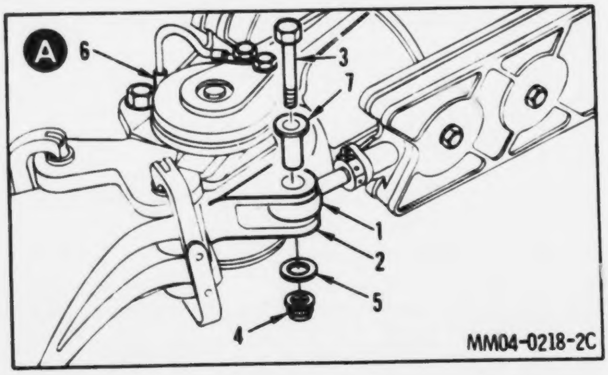
References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
1-7-7	Rotor brake locked
2-2-2	Access doors T250L, T250R, T290L, T290R, and L325 opened





A. REMOVAL

1. **Remove main rotor damper rod end (1) from lead-lag link (2).**

   a. Hold bolt (3). Use 1-1/16 box wrench.

   b. Remove nut (4) and washer (5).

   c. Remove bolt (3), grounding clip (6) (if required), and bushing (7).

   d. Swing rod end (1) free from link (2).

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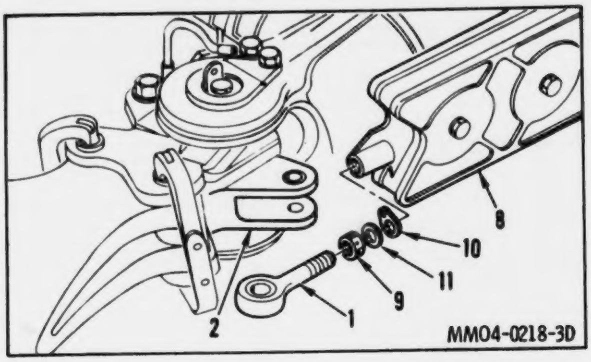
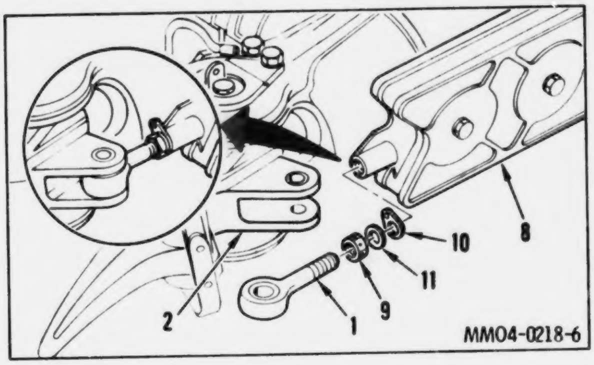
5-2-19. MAIN ROTOR DAMPER ROD END REMOVAL/INSTALLATION (cont) 5-2-19





2. **Unscrew rod end (1) from damper (8).**
   - a. Remove lockwire from jam nut (9) and keyed washer (10).
   - b. Loosen jam nut (9). Remove rod end (1) from damper (8). Use 1-3/8 crowfoot.
3. **Remove keyed washer (10), washer (11), and jam nut (9) from rod end (1).**

B. **CLEANING**

Wipe all removed and attaching parts with a clean rag.

NOTE

The two bolts through the plate section of the damper assembly may show looseness, particularly at low temperatures. This is a normal condition, not a defective condition, and no corrective action is required.

C. **INSPECTION**

1. **Check damper, rod end, jam nut, keyed washer, and lead-lag link for wear or damage** (para 5-2-1).
2. **Check rod end bearing ball for corrosion.** None allowed.
3. **Check rod end housing for corrosion.** Maximum 0.005 inch deep.
4. **Check rod end for cracks.** None allowed.

D. **INSTALLATION**

1. **Install rod end (1) in damper (8).**
   - a. Lubricate rod end (1) threads. Use solid film lubricant (E14).
   - b. Install jam nut (9), washer (11), and keyed washer (10) on rod end (1).
   - c. Screw rod end (1) into damper (8).

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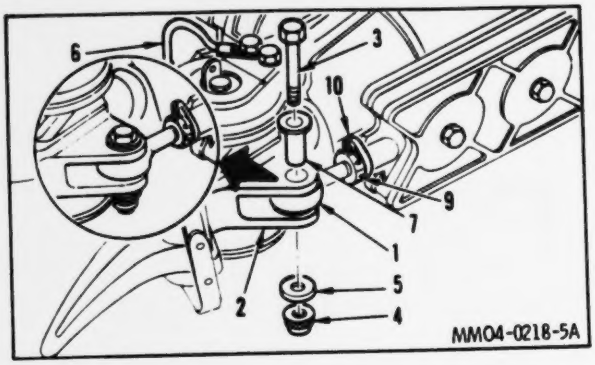
5-2-19. MAIN ROTOR DAMPER ROD END REMOVAL/INSTALLATION (cont) 5-2-19



2. **Aline rod end (1) with link (2) until bolt (3) can be installed and removed freely.**

3. **Install bolt (3) in link (2).**

   a. Install bushing (7) through lead-lag link (2) and rod end (1).

   b. Apply a coat of preservative to bolt (3). Use preservative (E54).

   c. Install bolt (3) with grounding clip (6) (if required) through bushing (7).

   d. Install washer (5) and nut (4).

4. **Torque nut (4) to 75 INCH-POUNDS.** Hold bolt (3). Use 1-1/16 box wrench and 3/8 drive torque wrench.

5. **Torque jam nut (9) to 1600 INCH-POUNDS.** Use 1-3/8 crowfoot and 1/2 drive torque wrench.

6. **Lockwire jam nut (9) to keyed washer (10).** Use lockwire (E15).

7. **Release rotor brake lock** (para 1-7-7).

8. **Inspect (TI).**

9. **Perform main rotor blade phase adjustment** (para 5-2-38).

10. **Secure access doors T250L, T250R, T290L, T290R, and L325** (para 2-2-2).

11. **Perform main rotor track and balance operational check** (TM 55-1520-238-T).

END OF TASK

5-2-20. MAIN ROTOR DAMPER REMOVAL/INSTALLATION 5-2-20

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, 1-1/16 & 1-1/8 Box	5120-00-228-9521
Wrench, Torque, 3/8 Drive	5120-00-821-3441
Wrench, Torque, 1/2 Drive	5120-00-270-3121
Adapter, 3/4, 1/2 Drive	5120-00-227-8088
Crowfoot Attachment, 1-3/8, 1/2 Drive	5120-00-181-6757
Caliper, Set, Micrometer, Outside	5210-00-554-7134
Caliper, Vernier	5210-00-234-8017

Materials/Parts:

(E14)	Thread Lubricant
(E54)	Preservative
(E61)	Sealing Compound

Personnel Required:

67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
1-7-7	Rotor brake locked
2-2-2	Access doors T250L, T250R, T290L T290R, and L325 opened

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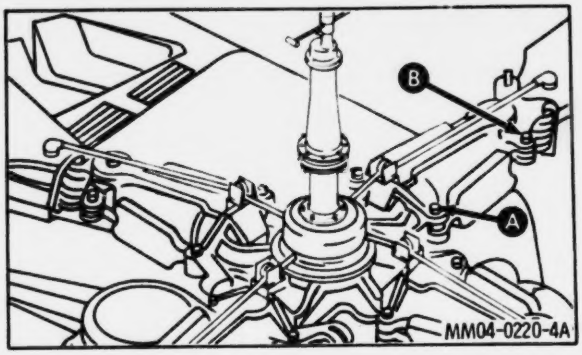
5-2-20. MAIN ROTOR DAMPER REMOVAL/INSTALLATION (cont) 5-2-20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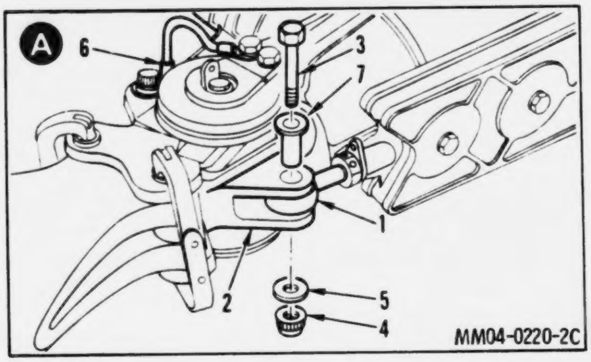
MM04-0220-4A

A. REMOVAL


A
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1
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MM04-0220-2C

1. **Remove damper rod end (1) from lead-lag link (2).**

   a. Hold bolt (3). Use 1-1/16 box wrench.

   b. Remove nut (4) and washer (5).

   c. Remove bolt (3), grounding clip (6) (if required), and bushing (7).

   d. Swing rod end (1) free from link (2).

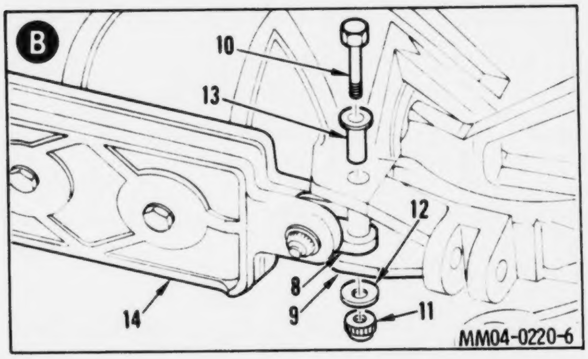
2. **Remove damper trunnion (8) from pitch housing (9).**

   a. Hold bolt (10). Use 1-1/16 box wrench.

   b. Remove nut (11) and washer (12).

   c. Remove bolt (10) and bushing (13).

   d. Remove main rotor damper (14).


B
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11
MM04-0220-6

GO TO NEXT PAGE

B. CLEANING

Wipe damper and mating surfaces with a clean rag.

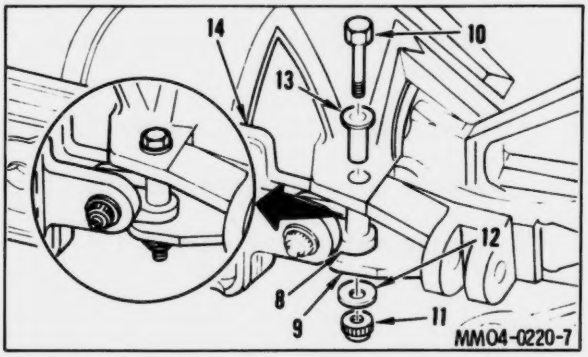
C. INSPECTION

NOTE

The two bolts through the plate section of the damper assembly may show looseness, particularly at low temperatures. This is a normal condition, not a defective condition, and no corrective action is required.

1. **Check damper trunnion for cracks.** None allowed.
2. **Check damper trunnion for the following:**
   a. Wear limit on damper to trunnion attachment. Maximum allowable radial play, 0.010.
   b. Wear limit on trunnion to pitch housing. Maximum allowable radial play, 0.010.
   c. There shall be no evidence of teflon debonding.
   d. Check damper, trunnion, bushing, and hardware for corrosion. Maximum depth 0.005.
3. **Check damper for cracks.** None allowed.
4. **Check elastomeric material on edge of damper for tears or delaminations.**
   a. Tears or delaminations along outer or inner ends of damper are acceptable if they have not spread apart along the upper or lower edges.
   b. Tears or delaminations along upper or lower edges of damper totaling more than four inches require replacement of damper.
5. **Check rod end** (para 5-2-19).

D. INSTALLATION



1. **Install damper (14) and trunnion (8) in pitch housing (9).**
   a. Lubricate bolt (10) and nut (11) threads. Use thread lubricant (E14).
   b. Install bushing (13) in pitch housing (9) and trunnion (8).
   c. Coat bolt (10) with preservative (E54).
   d. Install bolt (10) through bushing (13).
   e. Install washer (12) and nut (11).

GO TO NEXT PAGE

2. **Torque nut (11) to 1000 INCH-POUNDS.** Hold bolt (10). Use 1-1/16 box wrench and 1/2 drive torque wrench (700-1600 inch-pounds).

3. **Apply a continuous bead of sealing compound (E61) around upper lip of bushing (13)** (TM 55-1500-204-25/1).

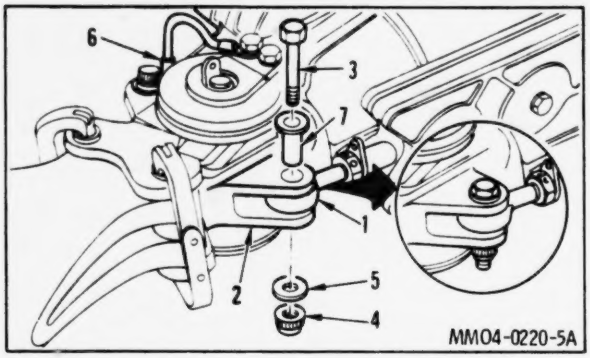
4. **Install rod end (1) in lead-lag link (2).**

   a. Install bushing (7) through lead-lag link (2) and rod end (1).

   b. Apply a coat of preservative to bolt (3). Use preservative (E54).

   c. Install bolt (3) with grounding clip (6) (if required) through bushing (7).

   d. Install washer (5) and nut (4).



5. **Torque nut (4) to 655 INCH-POUNDS.** Hold bolt (3). Use 1-1/16 box wrench, 3/8 drive torque wrench.

6. **Inspect (TI).**

7. **Release rotor brake lock** (para 1-7-7).

8. **Perform main rotor blade phase adjustment** (para 5-2-38).

9. **Secure access doors T250L, T250R, T290L, T290R, and L325** (para 2-2-2).

10. **Perform main rotor track and balance operational check** (TM 55-1520-238-T).

END OF TASK

5-2-21. MAIN ROTOR LEAD-LAG LINK BEARING RETAINER AND BEARING REPLACEMENT 5-2-21

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-003-5267
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Wrench, Torque, 3/8 Drive	5120-00-821-3441
Mallet, Rawhide	5120-00-222-2220
Driftpin, 1/2-inch	5120-00-239-0036
Socket, 1-1/16, 1/2 Drive	5120-00-935-7427
Wrench, 1-1/16 & 1-1/8 Box	5120-00-228-9521

Materials/Parts:

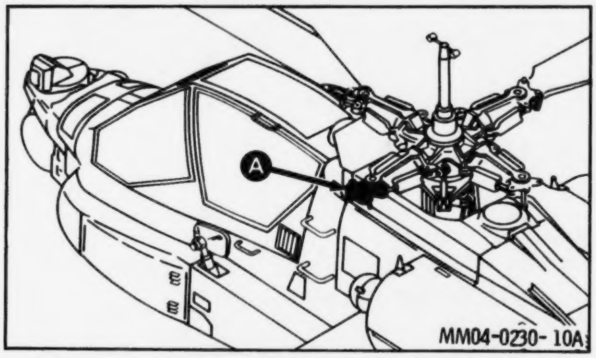
(E14)	Solid Film Lubricant
(E15)	Lockwire
(E48)	Lubricant
(E54)	Preservative

Personnel Required:

68D10	Aircraft Powertrain Repairer (2) One to assist

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
5-2-4	Main rotor blade removed



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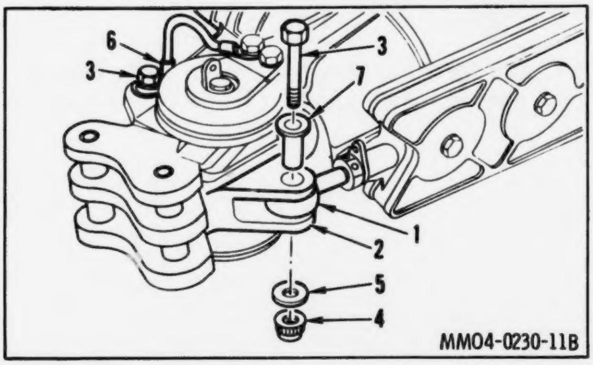

MM04-0230-11B

A. REMOVAL

1. **Remove two damper rod ends (1) from lead-lag link (2).**

   a. Hold two bolts (3). Use 1-1/16 box wrench.

   b. Remove two nuts (4) and two washers (5). Use 1-1/16 socket.

   c. Remove bolts (3), grounding clip (6) (if required), and two bushings (7) from lead-lag link (2).

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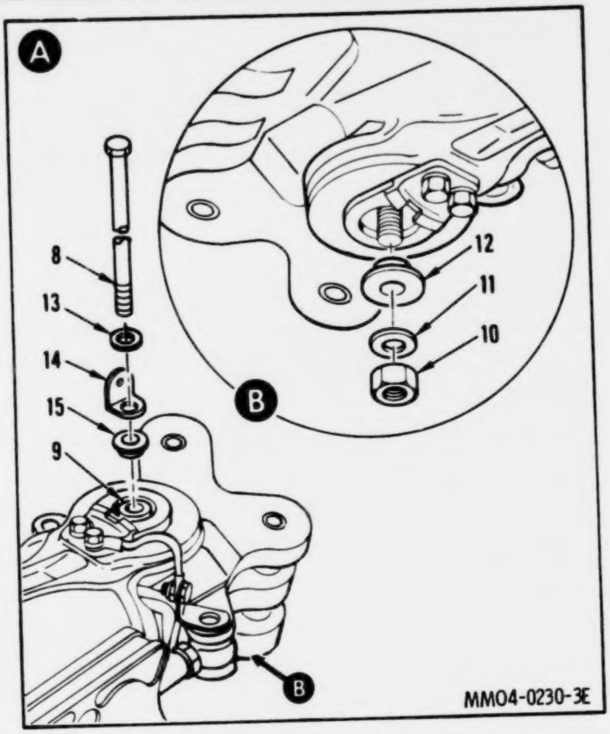
5-2-21. MAIN ROTOR LEAD-LAG LINK BEARING RETAINER AND BEARING REPLACEMENT (cont) 5-2-21



MM04-0230-3E

2. **Remove center bolt (8) from link pin (9).**

   a. Hold bolt (8). Remove nut (10) washer (11), and bushing (12).

   b. Remove bolt (8), washer (13), clip (14), and bushing (15) from pin (9).

NOTE

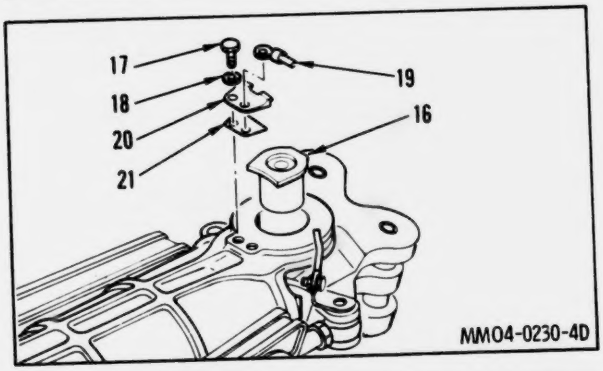
Mallet and driftpin may be required to remove bearings.

3. **Remove main rotor upper lead-lag link bearing (16).**

   a. Remove lockwire from two bolts (17).

   b. Remove two bolts (17), washers (18), and grounding jumper (19).

   c. Remove bearing retainer (20), shim (21) if installed, and bearing (16).



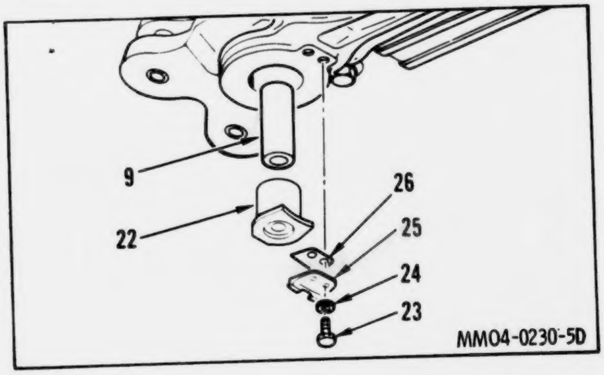
MM04-0230-4D

4. **Remove main rotor lower lead-lag link bearing (22).**

   a. Remove lockwire from two bolts (23).

   b. Remove two bolts (23) and washers (24).

   c. Remove bearing retainer (25), shim (26) if installed, bearing (22), and link pin (9).



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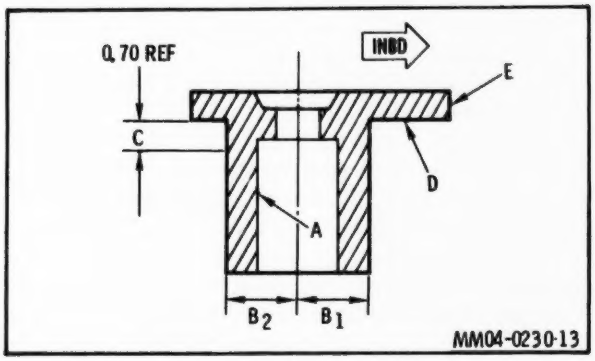
5-2-21. MAIN ROTOR LEAD-LAG LINK BEARING RETAINER AND BEARING REPLACEMENT (cont) 5-2-21

B. CLEANING

Clean center bolt, link pin, bushings, clip, bearings, bushing retainers and, lead-lag link, and all related hardware (para 1-5-36).

C. INSPECTION

1. **Check center bolt, link pin, clip, bearings, retainers, lead-lag link, and all related hardware for damage and distortion.** None allowed.
2. **Check retainers for burrs, nicks, or scratches.** Damage not to exceed 0.010 MAX.
3. **Check link pin for scratches, nicks, gouges, and dents.** Damage not to exceed **0.010 MAX**. Blend sharp edges. Local areas which come in contact with lead lag bearing. Damage not to exceed **0.005 MAX**. Blend sharp edges.
4. **Check inside diameter of bearing.** Bearing ID not to exceed **1.506 INCHES**.
5. **Check bearing for wear and damage in the following zones.**



MM04-0230-13

ZONE A. Any crack is cause for rejection.

ZONE B. Worn anodizing, permissible if in ZONE B2. Up to 0.50 x 0.50 MAX. 2 places in ZONE B1. Any crack is cause for rejection.

ZONE C. Scoring and galling permissible to a depth of 0.005 inch.

ZONE D. Corrosion, scoring, galling. Permissible up to 0.010 MAX.

ZONE E. Fretting and galling permissible to a maximum depth of 0.010 inch.

GO TO NEXT PAGE

5-2-21. MAIN ROTOR LEAD-LAG LINK BEARING RETAINER AND BEARING REPLACEMENT (cont) 5-2-21

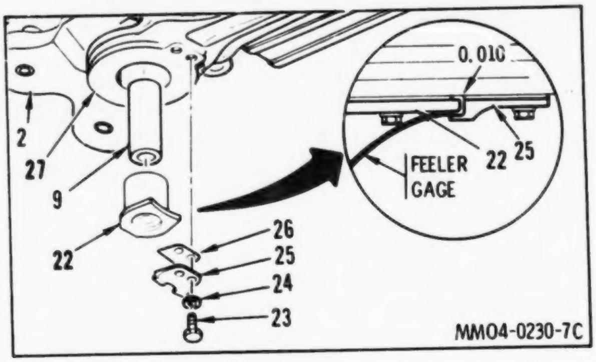
D. INSTALLATION

1. **Lubricate all attaching hardware threads.** Use lubricant (E14).

NOTE

Mallet may be required to install link pin and lead-lag link bearing.

2. **Install link pin (9) and lower lead-lag link bearing (22).** Torque two bolts (23) to **70 INCH-POUNDS.**



   a. Apply a coat of lubricant to link pin (9) and bearing (22). Use lubricant (E48).

   b. Lift pitch housing (27). Move housing as needed to aline stretch strap pack and lead-lag link (2) with pitch housing bearing bore.

   c. Install pin (9) and bearing (22) in housing (27).

   d. Install bearing retainer (25), and shim (26) if required, on pitch housing (27). Aline holes.

   e. Install two washers (24) and two bolts (23).

   f. Torque two bolts (23) to **70 INCH-POUNDS.** Use 1/4 drive torque wrench.

3. **Check gap between bearing retainer (25) and bearing (22).** Gap required is **0.010-INCH.** If gap is not **0.010-INCH,** remove bearing retainer (25). Add or subtract shim (26) as required.

4. **Lockwire two bolts (23).** Use lockwire (E15).

GO TO NEXT PAGE

5-2-21. MAIN ROTOR LEAD-LAG LINK BEARING RETAINER AND BEARING REPLACEMENT (cont) 5-2-21

NOTE

Mallet may be required to install lead-lag link bearing.

5. **Install upper lead-lag link bearing (16).** Torque two bolts (17) to **70 INCH-POUNDS.**

   a. Apply a coat of lubricant to bearing (16). Use lubricant (E48).

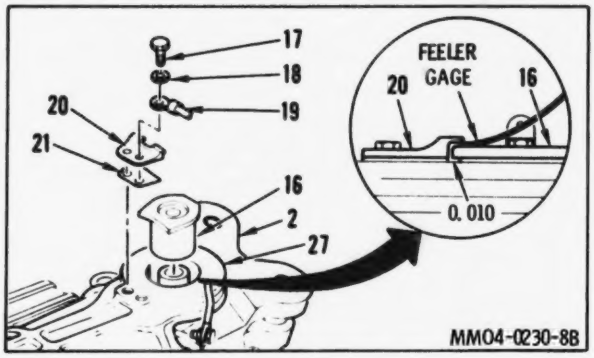
   b. Lift pitch housing (27). Move housing as needed to aline stretch strap pack and lead-lag link (2) with pitch housing bearing bore.

   c. Install bearing (16).

   d. Install bearing retainer (20), and shim (21) if required, on pitch housing (27) with holes alined.

   e. Install jumper (19), two washers (18), and two bolts (17).

   f. Torque two bolts (17) to **70 INCH-POUNDS.** Use 1/4 drive torque wrench.



6. **Check for 0.010-INCH gap between bearing retainer (20) and bearing (16).** If gap is not **0.010-INCH,** remove bearing retainer (20). Add or subtract shim (21) as required.

7. **Lockwire two bolts (17).** Use lockwire (E15).

GO TO NEXT PAGE

5-2-21. MAIN ROTOR LEAD-LAG LINK BEARING RETAINER AND BEARING REPLACEMENT (cont) 5-2-21

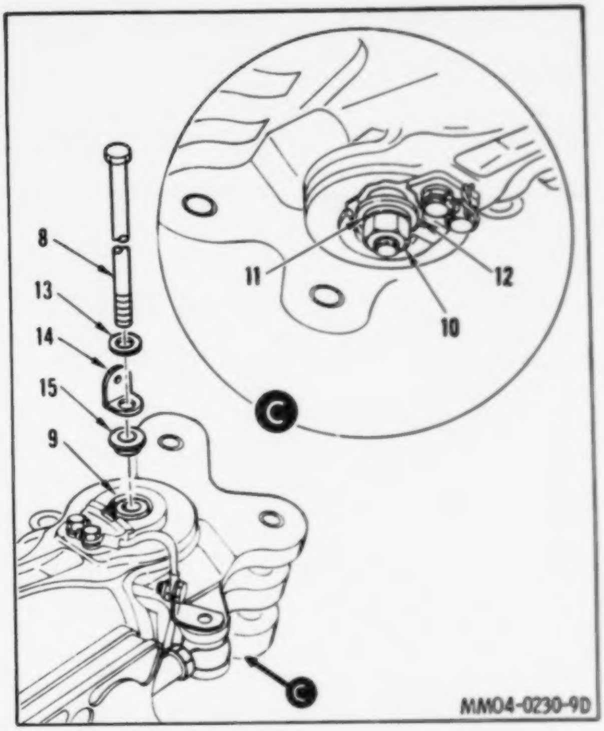
8. **Install bolt (8) with clip (14) in pin (9).** Torque nut (10) to **35 INCH-POUNDS.**

   a. Install centering bolt (8) through washer (13), clip (14), and bushing (15) and pin (9).

   b. Hold bolt (8).

   c. Install bushing (12), washer (11), and nut (10).

   d. Torque nut (10) to **35 INCH-POUNDS.** Use 1/4 drive torque wrench.



MM04-0230-9D

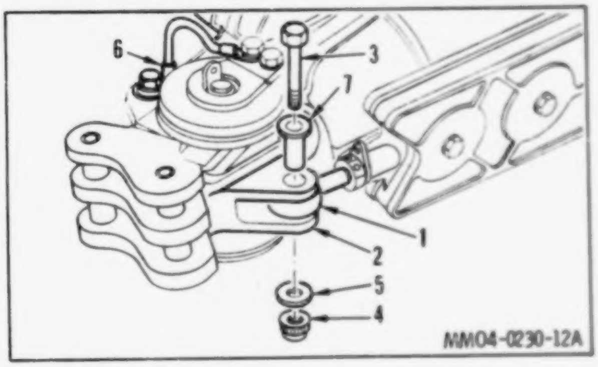
9. **Install rod end (1) in lead-lag link (2) 2 places.**

   a. Install bushing (7) through link (2) and rod end (1), two places.

   b. Apply a coat of preservative to two bolts (3). Use preservative (E54).

   c. Install two bolts (3) with grounding clip (6) (if required), through bushings (7).

   d. Install washers (5) and nuts (4).



MM04-0230-12A

10. **Torque two nuts (4) to 655 INCH-POUNDS.** Hold bolt (3). Use 1-1/16 box wrench, 1-1/16 socket, and 3/8 drive torque wrench.

11. **Inspect (TI).**

12. **Install main rotor blade** (para 5-2-5).

END OF TASK

5-2-22. MAIN ROTOR LEAD-LAG LINK REMOVAL/INSTALLATION 5-2-22

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-003-5267
Wrench, Torque, 3/8 Drive	5120-00-821-3441
Wrench, 1-1/16 & 1-1/8 Box	5120-00-228-9521
Caliper, Set, Micrometer, Outside	5210-00-534-7139
Caliper, Vernier	5120-00-234-8017

Materials/Parts:

(E14) Thread Lubricant

Personnel Required:

68D10	Aircraft Powertrain Repairer (2)
66R30	Inspector/Supervisor

Equipment Conditions:

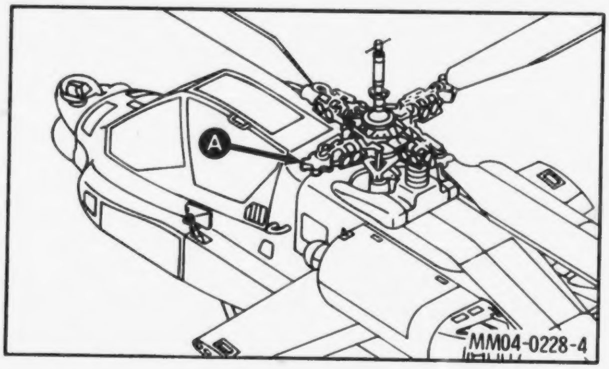
Ref	Condition
1-7-2	Helicopter safed
5-2-4	Main rotor blade removed
5-2-21	Main rotor lead-lag link bearing retainer and bearing removed

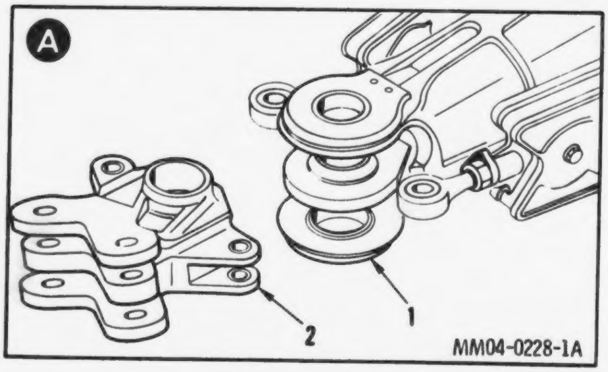
A. REMOVAL

Support pitch housing (1) and pull lead-lag link (2) from housing (1).

B. CLEANING

Wipe pitch housing, exposed strap pack, and lead-lag link with a clean rag.





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C. INSPECTION

1. **Check pitch housing and exposed strap pack for wear and damage** (para 5-2-1).

2. **Check lead-lag link.**

   a. Blade attach lug bushings ID (3) (6 places) shall not exceed **1.066 inches.**

   b. Damper attach lug flanged bushings ID (4) (2 places) shall not exceed **0.748-inch.**

   c. Damper attach lug flush bushings ID (5) (2 places) shall not exceed **0.948-inch.**

   d. Thickness at blade attach upper and lower lug ID (6) (4 places) shall not be less than **0.790-inch.**

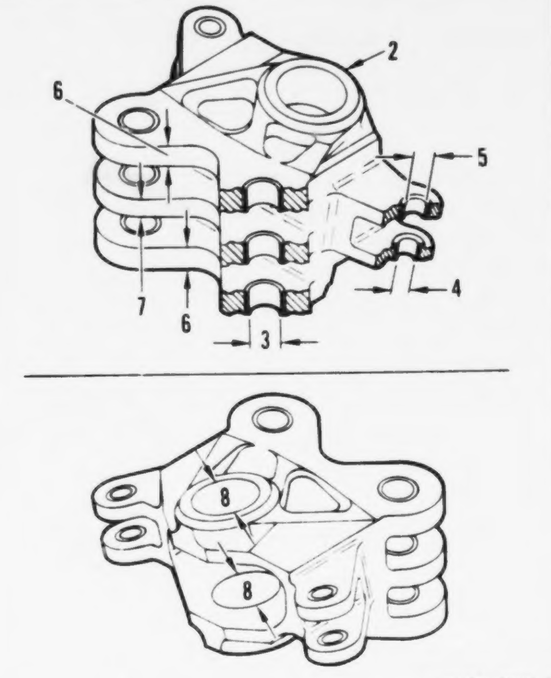
   e. Thickness at blade attach inner lugs ID (7) (2 places) shall not be less than **0.690-inch.**

   f. Inside diameter of center pivot upper and lower holes ID (8) over teflon liners (2 places) shall not exceed **2.536 inches.**

   g. If center pivot teflon liners are installed, there shall be no evidence of liner penetration to metal at any point.

   h. Teflon liner debonding. None allowed.

   i. Check link for nicks, gouges, scratches, scoring, galling and corrosion. Maximum permissible depth without repair is 0.001. Depth up to 0.005 must be blended.



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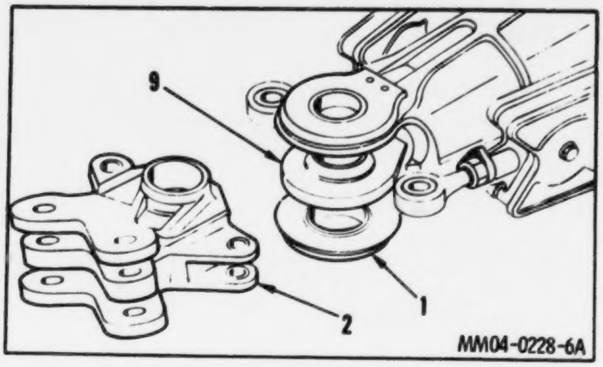
5-2-22. MAIN ROTOR LEAD-LAG LINK REMOVAL/INSTALLATION (cont) 5-2-22

D. INSTALLATION



1. **Support housing (1).** Install link (2). Aline link (2) with stretched strap (9) and housing (1).

2. **Install main rotor lead-lag link bearing retainer and bearing** (para 5-2-21).

3. **Install main rotor blade** (para 5-2-5).

4. **Inspect (TI).**

END OF TASK

5-2-23. MAIN ROTOR PITCH HOUSING REMOVAL 5-2-23

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-003-5267

Personnel Required:

68D10 Aircraft Powertrain Repairer (2)
One to assist

References:

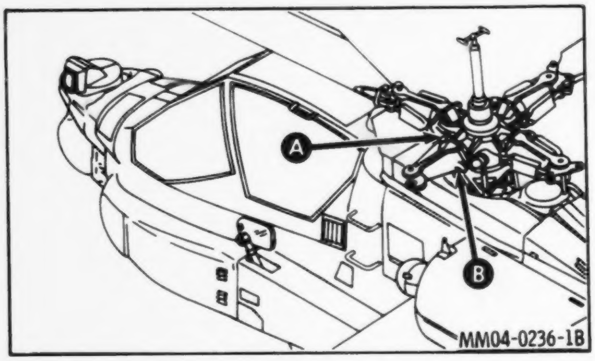
TM 55-1520-204-25/1

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
5-2-4	Main rotor blade removed
5-2-20	Main rotor dampers removed
5-2-21	Main rotor lead-lag link bearing retainer and bearing removed
5-2-22	Main rotor lead-lag link removed
11-3-45	Main rotor blade pitch link disconnected

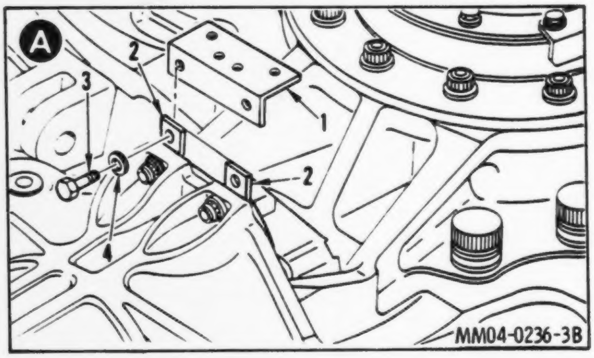
CAUTION

Do not allow stretch strap pack to remain unsupported when pitch housing is removed. Support strap pack in horizontal position. Failure to do so may result in damage to strap pack.



A. REMOVAL

1. **Remove harness support bracket (1) from striker strips (2).** Remove two bolts (3), two washers (4), and bracket (1) from striker strips (2).



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5-2-23. MAIN ROTOR PITCH HOUSING REMOVAL (cont) 5-2-23

2. **Support pitch housing (5).** Remove two lower bolts (6).

   a. Hold two bolts (6).

   b. Remove two nuts (7) and four washers (8).

   c. Remove two bolts (6) and washers (9) from feathering bearing housing (10).

3. **Remove two nuts (11) and four washers (12) from upper bolts (13).**

   a. Hold two bolts (13).

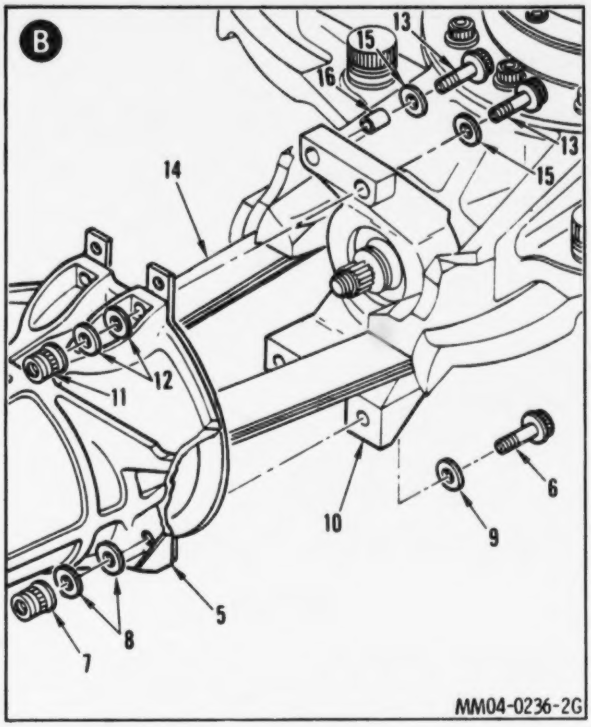
   b. Remove two nuts (11) and four washers (12).

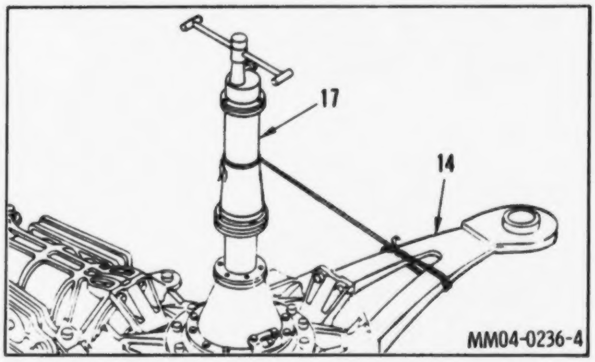
4. **Remove housing (5) from feathering bearing housing (10).**

   a. Pull housing (5) from housing (10) and stretch strap pack (14). Support stretch strap pack (14) in horizontal position as pitch housing (5) is removed.

   b. Keep stretch strap pack (14) in horizontal position by supporting strap pack with a rope tied to the center of strap pack (14) and secured to the air data mast (17).

   c. Remove two upper bolts (13), washers (15), and bushings (16) from housing (10).





B. CLEANING

Wipe harness support bracket, striker strips, pitch housing, feathering bearing, feathering bearing housing, and stretch strap pack with a clean rag.

GO TO NEXT PAGE

5-2-23. MAIN ROTOR PITCH HOUSING REMOVAL (cont) 5-2-23

C. INSPECTION

1. **Check striker plates, feathering bearing housing, feathering bearing, and stretch strap pack for damage** (para 5-2-1).
2. **Check harness support bracket for loose or damaged nut plates** (TM 55-1500-204-25/1).
3. **Check pitch housing for cracks.** None allowed.
4. **Check pitch housing for nicks, scratches, and gouges and corrosion.** Defects up to 0.010 inch deep, 0.010 inch wide, and 0.050 inch long.
5. **Check pitch housing shim for debonding.** No debonding allowed.
6. **Check inboard feathering bearing mounting holes for wear.** Maximum diameter of inboard holes is 0.407 inch.
7. **Check pitch link holes for wear.**
    a. Flange bushings maximum diameter is 0.7505 inch.
    b. Aluminum bronze bushing maximum diameter is 0.8765 inch.
8. **Check outboard lead lag link mounting holes for wear.** Teflon liner minimum thickness 0.008 inch.
    a. Maximum radial play between lead lag link bearing and teflon lined insert is 0.015.
    b. Teflon liner material cannot be worn through.
9. **Check damper holes for wear.**
    a. Upper bushing 0.7508 maximum.
    b. Lower bushing 0.8771 maximum.

END OF TASK

5-2-24. MAIN ROTOR BLADE STRAP PACK REPAIR CRITERIA 5-2-24

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5120-00-003-5267
Shears, Metal Cutting	5110-00-273-0128

Materials/Parts:

(E102) Tongue Depressor

Personnel Required:

67D10	Aircraft Powertrain Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

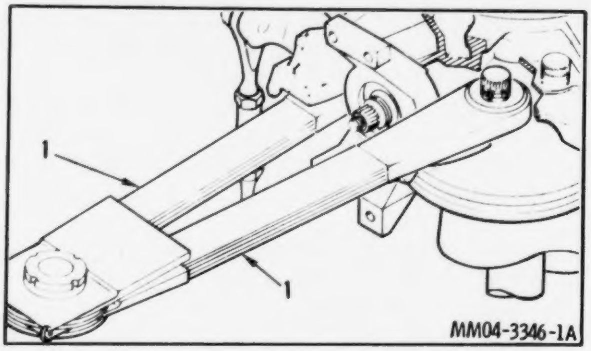
Ref	Condition
1-7-2	Helicopter safed
5-2-23	Main rotor pitch housing removed

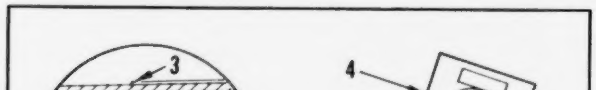
NOTE

This task is typical for all four strap packs.

1. **Check top and bottom of strap pack (1) for failed laminates** (para 5-2-1).
2. **If top or bottom laminate (2) is cracked or broken, remove laminate (2).** The removal of one laminate (2) on one strap (1) is one failure.
    a. Measure from strap pack strip (3) **2-1/2 INCHES** outboard on laminate (2).
    b. Measure from strap pack shoe (4) **4 INCHES** inboard on laminate (2).
    c. Insert tongue depressor (E102) between cracked or broken laminate (2) and good laminate (5) at the 4 inch and 2-1/2 inch spots.
    d. Trim cracked or broken laminate (2). Use shears.
    e. Bend trimmed edges (6) 45 degrees away from good laminate (5).
3. **Inspect (TI).**
4. **Install main rotor pitch housing** (para 5-2-23).

END OF TASK





5-2-25. MAIN ROTOR PITCH HOUSING INSTALLATION 5-2-25

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-003-5267
Wrench, Torque, 3/8 Drive	5120-00-821-3441

Materials/Parts:

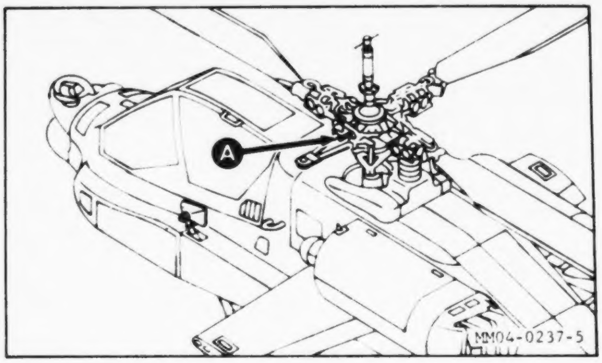
(E14)	Thread Lubricant

Personnel Required:

68D10	Aircraft Powertrain Repairer (2) One to assist
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



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5-2-25. MAIN ROTOR PITCH HOUSING INSTALLATION (cont) 5-2-25

1. **Lubricate threads of bolts and nuts.** Use lubricant (E14).

2. **Install two bushings (3), washers (2), and long bolts (1) in top of feathering bearing housing (4).**

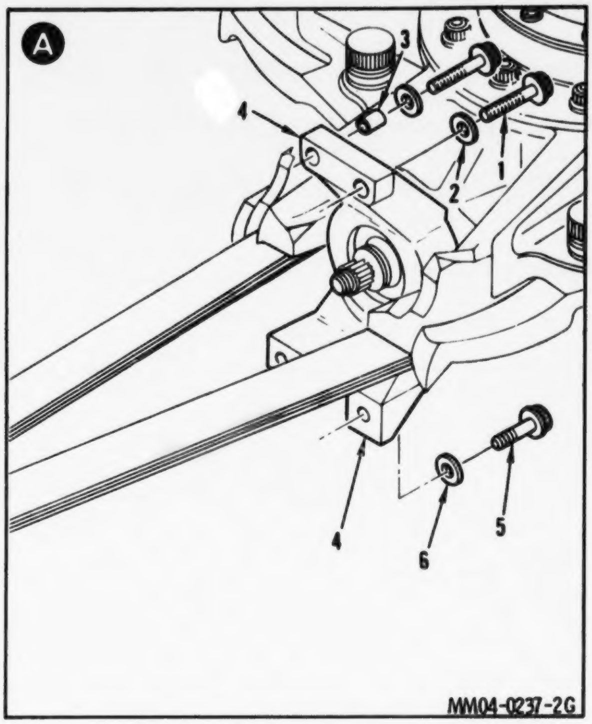
3. **Install two washers (6) and short bolts (5) in bottom of housing (4).**

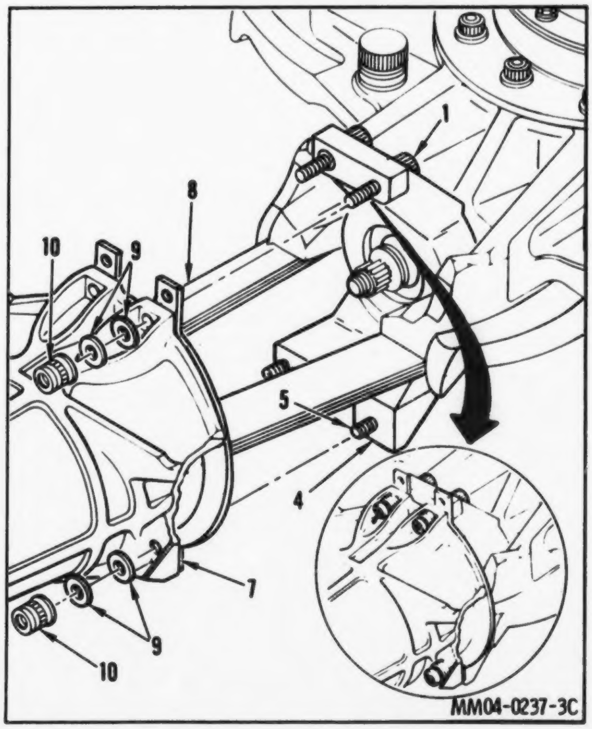
4. **Install housing (7) on feathering bearing housing (4).**

   a. Slide pitch housing (7) over stretch strap pack (8). Mount housing (7) on bolts (1) and (5).

   b. Install four washers (9) and nuts (10).

5. **Torque four nuts (10) to 330 INCH-POUNDS.** Hold bolts (1) and (5).





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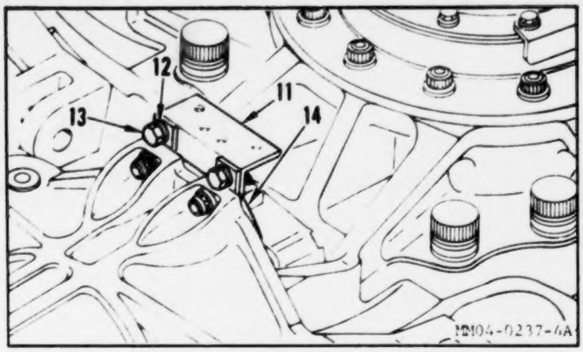
5-2-25. MAIN ROTOR PITCH HOUSING INSTALLATION (cont) 5-2-25



6. **Install harness support bracket (11), two washers (12), and two bolts (13) on striker strips (14).**

7. **Inspect (TI).**

8. **Install main rotor blade pitch link** (para 11-3-45).

9. **Install main rotor lead-lag link** (para 5-2-22).

10. **Install main rotor lead-lag link bearing and bearing retainer** (para 5-2-21).

11. **Install main rotor dampers** (para 5-2-20).

12. **Install main rotor blade** (para 5-2-5).

END OF TASK

5-2-26. MAIN ROTOR FEATHERING BEARING HOUSING REMOVAL/INSTALLATION (AVIM) 5-2-26

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-003-5267
Wrench, Torque, 1/2 Drive	5120-00-221-7983
Handle, Slide, T-Style, 3/4 Drive	5120-00-099-8544
Adapter, 3/4, 1/2 Drive	5120-00-227-8088
Socket, Deep, 15/16, 1/2 Drive	5120-00-935-7452
Gloves, Rubber	8415-00-266-8677
Apron, Impermeable	8415-00-082-6108
Goggles	4240-00-052-3776
Respirator, Air Filtering	4240-00-022-2524

Materials/Parts:

(E14)	Solid Film Lubricant
(E28)	Sealing Compound
(E39)	Trichloroethane
(E54)	Preservative

Personnel Required:

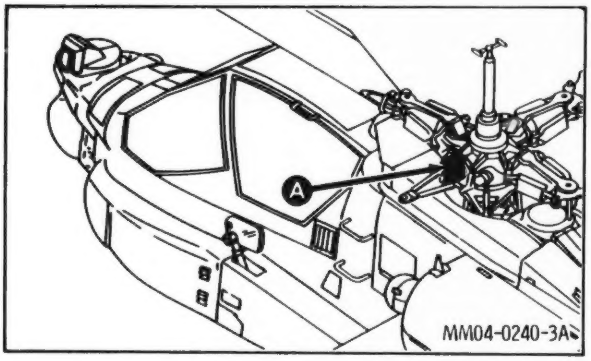
68D10	Aircraft Powertrain Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
5-2-4	Main rotor blade removed
5-2-20	Main rotor dampers removed
5-2-21	Main rotor lead-lag link bearing retainer and bearing removed
5-2-22	Main rotor lead-lag link removed
5-2-23	Main rotor pitch housing removed

CAUTION

To prevent damage and failure of strap pack lamination, do not scratch or stretch strap packs when removing feathering bearing housing.



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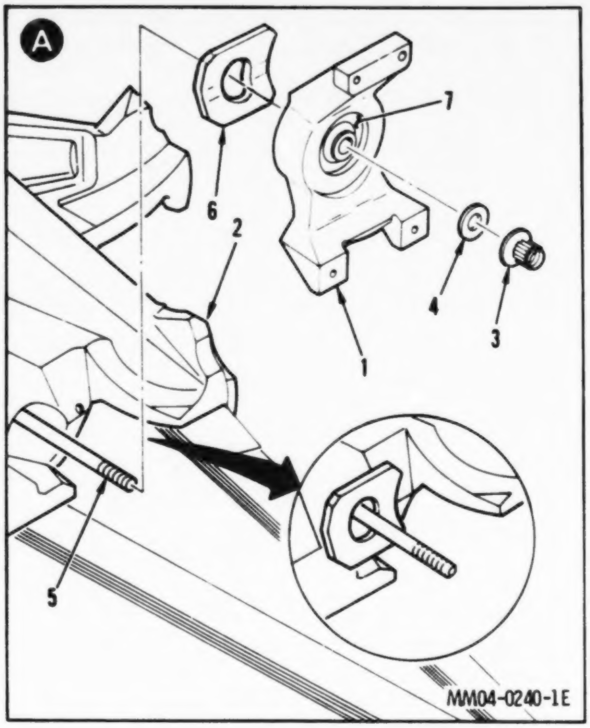
5-2-26. MAIN ROTOR FEATHERING BEARING HOUSING REMOVAL/INSTALLATION (AVIM) (cont) 5-2-26



A. REMOVAL

1. **Remove feathering bearing housing (1) from hub (2).**

   a. Remove nut (3) and washer (4).

   b. Pull housing (1) clear of stud (5).

2. **Remove footing plate (6).**

B. CLEANING

Wipe all removed and attaching parts with a clean rag. Ensure that mating surface is free of sealant.

C. INSPECTION

1. **Check feathering bearing housing, hub, and stud for cracks, and thread damage.** None allowed. Dent and scoring on housing up to **0.063 inch** must be blended.

2. **Check feathering bearing housing, hub, and stud for corrosion** (para 1-5-38). If light corrosion is present on more than 25% of housing surface area, replace housing.

3. **Check feather bearing elastomeric for damage** (para 5-2-1).

D. INSTALLATION

1. **Lubricate stud (5) and nut (3) threads.** Use solid film lubricant (E14). Coat stud (5) with preservative. Use preservative (E54).

2. **Apply a continuous bead of sealing compound to both faces of footing plate (6) where it mates with housing (1) and hub (2).** Use sealing compound (E28).

3. **Install footing plate (6) on stud (5).**

GO TO NEXT PAGE

5-2-26. MAIN ROTOR FEATHERING BEARING HOUSING REMOVAL/INSTALLATION (AVIM) (cont) 5-2-26

4. **Install feathering bearing housing (1) on stud (5).** Torque nut (3) to **320 FOOT-POUNDS.**

   a. Install housing (1) on stud (5) and aline with hub (2) mating surface.

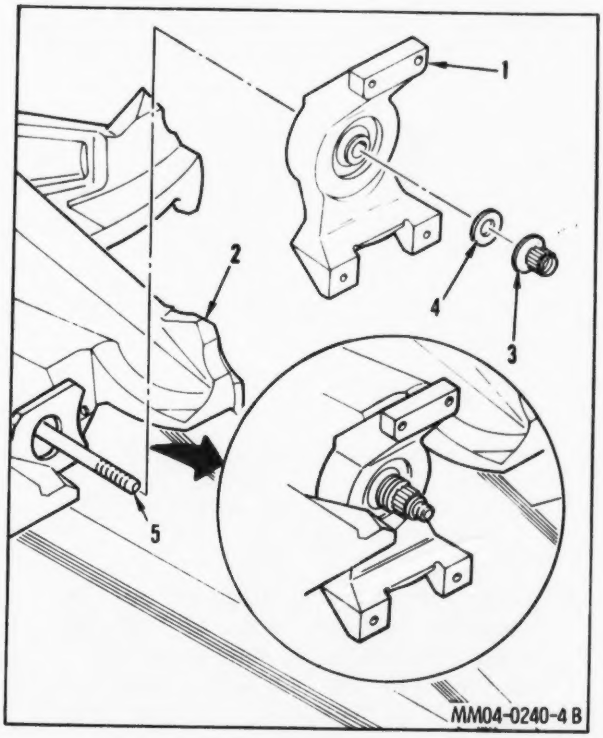
   b. Apply a continuous bead of sealing compound to both faces of washer (4) where it mates with housing (1) and nut (3). Use sealing compound (E28).

   c. Install washer (4) and nut (3).

   d. Torque nut (3) to **320 FOOT-POUNDS.**

WARNING

Trichloroethane is highly toxic. Use in a well ventilated area. Breathing vapors could cause dizziness. If trichloroethane comes in contact with eyes or skin, flush with water. If trichloroethane comes in contact with eyes or dizziness occurs, seek medical aid.



5. **Remove any excess sealing compound from exposed surfaces.** Use trichloroethane (E39). Wear goggles, gloves, apron, and respirator.

6. **Inspect (TI).**

7. **Install main rotor pitch housing** (para 5-2-23).

8. **Install main rotor lead-lag link** (para 5-2-22).

9. **Install main rotor lead-lag link bearing retainer and bearing** (para 5-2-21).

10. **Install main rotor dampers** (para 5-2-20).

11. **Install main rotor blade** (para 5-2-5).

END OF TASK

5-2-27. MAIN ROTOR DROOP STOP FOLLOWER AND ROLLER REPLACEMENT (AVIM) 5-2-27

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-003-5267
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Materials/Parts:

(E14) Thread Lubricant

Personnel Required:

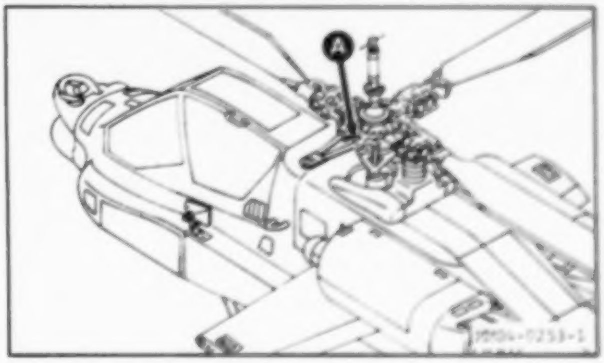
68D10	Aircraft Powertrain Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-PM

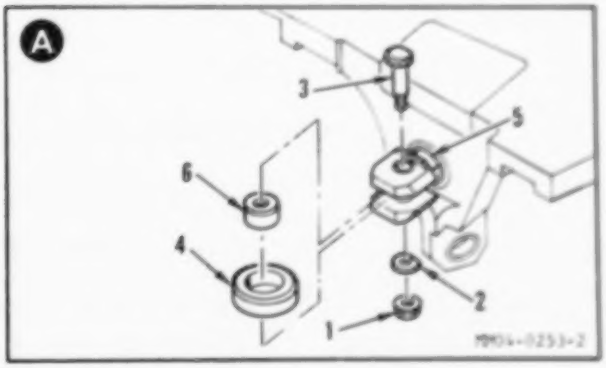
Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
5-2-3	Main rotor blade removed
5-2-20	Main rotor dampers removed
5-2-21	Main rotor lead-lag link bearing retainer and bearing removed
5-2-22	Main rotor lead-lag link removed
5-2-23	Main rotor pitch housing removed
5-2-26	Feathering bearing housing removed



A. REMOVAL

1. Remove nut (1) and washer (2) from roller bolt (3).
2. Remove roller bolt (3).
3. Remove roller (4) from follower (5).
4. Remove inner race (6) from roller (4).



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5-2-27. MAIN ROTOR DROOP STOP FOLLOWER AND ROLLER REPLACEMENT (AVIM) (cont) 5-2-27

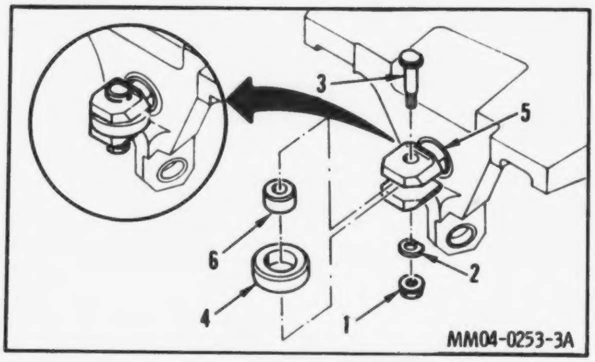
B. CLEANING

Wipe nut, washer, bolt, roller, inner race, and follower with a clean rag.

C. INSPECTION

1. Check roller wear, inner race, and follower for cracks (para 5-2-1). None allowed. Dents/flat spots shall not exceed 0.010 inch.
2. Check for wear through anodizing on inner race not allowed.
3. Check for debonding of teflon.
4. Check roller, inner race, and follower for corrosion (para 1-5-38).

D. INSTALLATION



1. Install inner race (6) in roller (4).
2. Position roller (4) in follower (5).
3. Lubricate threads of bolt (3). Use lubricant (E14).
4. Install bolt (3) through follower (5) and roller (4). Torque nut (1) to 100 INCH-POUNDS.
    a. Install washer (2) and nut (1).
    b. Hold bolt (3). Torque nut (1) to 100 INCH-POUNDS.
5. Inspect (TI).
6. Install feathering bearing housing (para 5-2-26).
7. Install main rotor pitch housing (para 5-2-25).
8. Install main rotor lead-lag link (para 5-2-22).
9. Install main rotor lead-lag link bearing retainer and bearing (para 5-2-21).
10. Install main rotor dampers (para 5-2-20).
11. Install main rotor blade (para 5-2-5).
12. Inspect droop angle (TM 55-1520-238-PM).

END OF TASK

5-2-28. MAIN ROTOR PITCH HOUSING SHIM REPLACEMENT (AVIM) 5-2-28

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-003-5267
Gloves, Cotton	8414-00-268-8330
Gloves, Rubber	8415-00-266-8677
Gloves, Heat Protect	8415-01-092-3910
Knife, Putty	5120-00-221-1536
Knife, Pocket	5110-00-240-5943
Respirator, Air Filtering	4240-00-022-2524
Apron, Impermeable	8415-00-082-6108
Heater, Gun Type	4940-00-785-1162
Thermometer, Self Indicating	6685-00-566-8666

Materials/Parts:

(E20)	Abrasive Paper
(E21)	Abrasive Paper
(E22)	Methyl Ethyl Ketone
(E39)	Trichloroethane
(E95)	Adhesive

References:

TM 55-1500-345-23
TM 55-1520-238-PM

Personnel Required:

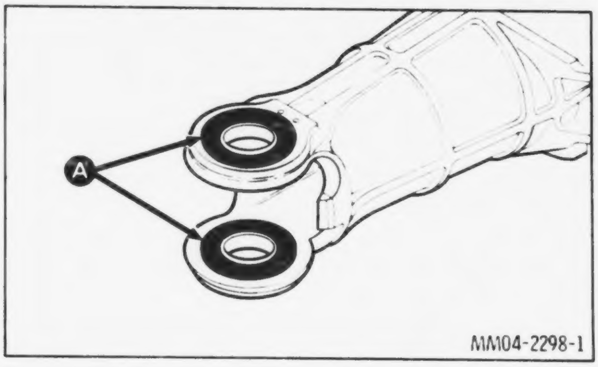
68D10	Aircraft Powertrain Repairer
66R30	Inspector/Supervisor

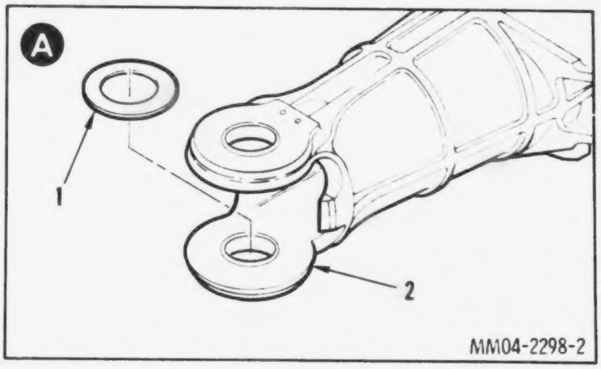
A. REMOVAL

NOTE

This task is typical of all pitch housing shims.

Remove shim (1) from pitch housing (2). Use putty knife.





B. CLEANING

WARNING

MEK is highly flammable and toxic. Use in a well ventilated area and away from open flames. Breathing vapors could cause dizziness. If MEK comes in contact with eyes or skin, flush with water. If MEK comes in contact with eyes, or dizziness occurs, seek medical aid.

Wipe pitch housing with a clean rag and MEK (E22). Use rubber gloves, apron, and respirator.

C. INSPECTION

Check pitch housing shim mounting area for damage. No cracks permitted. Other defects up to 0.010 inch deep 0.010 inch wide and 0.050 inch long are acceptable.

GO TO NEXT PAGE

D. INSTALLATION

1. **Remove old adhesive use abrasive paper (E20), followed by abrasive paper (E21).** Do not sand off original (pink) primer.

WARNING

Trichloroethane is toxic. Use in a well ventilated area. Breathing vapors could cause dizziness. If trichloroethane comes in contact with eyes or skin, flush with water. If trichloroethane comes in contact with eyes or if dizziness occurs, seek medical aid.

2. **Wipe new shim (1) and pitch housing (2) mating surface clean.** Use trichloroethane (E39). Wear goggles, rubber gloves, apron, and respirator.

3. **Prepare new shim (1) for installation.** Wear cotton gloves.

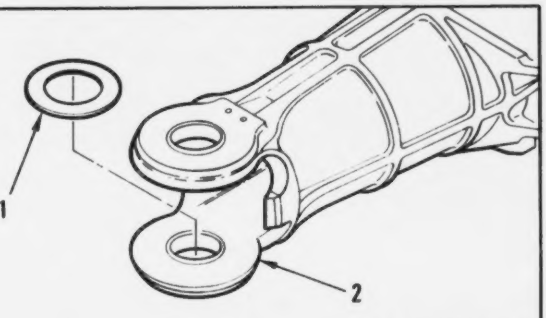
   a. Remove paper backing (3) from one side of adhesive (E95) (4).

   b. Place shim (1) on adhesive (4) and press firmly.

   c. Turn shim (1), with adhesive (4) side up, and work all air bubbles from adhesive backing (3).

   d. Remove excess paper backing from shim (1). Use pocket knife.

   e. Remove paper backing from other side of adhesive (4).



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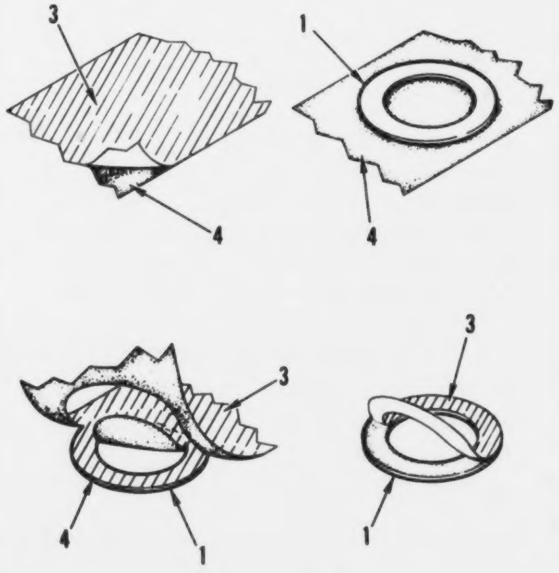

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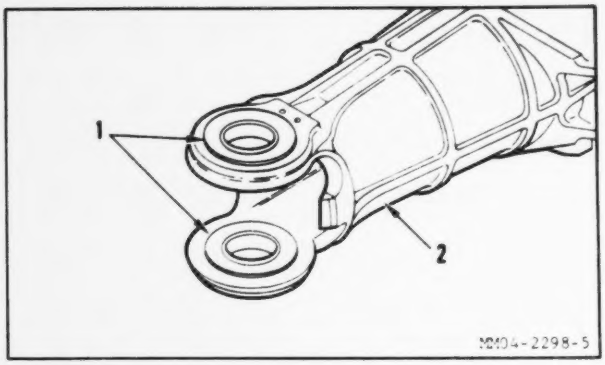
5-2-28. MAIN ROTOR PITCH HOUSING SHIM REPLACEMENT (AVIM) (cont) 5-2-28

4. Install shim (1) on pitch housing (2) and press firmly in place.



WARNING

A heat gun can cause burns. Do not allow heat gun to contact skin. Wear protective equipment. If injury occurs, seek medical aid.

5. Cure shim (1) for 65 minutes, at a temperature of 260 °F, Use heat gun, thermometer, and heat protect gloves.
6. Check shim (1) inner and outer ring area for air bubbles under shim (1). None allowed.
7. Inspect (TI).
8. Inspect droop angle (TM 55-1520-238-PM).

END OF TASK

5-2-29. MAIN ROTOR PITCH HOUSING WIRE SUPPORT CLIP REPLACEMENT (AVIM) 5-2-29

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Airframe Repairer's	5180-00-323-4876
Heater, Gun Type, Electric	4940-00-785-1162
Apron, Impermeable	8415-00-082-6108
Gloves, Rubber	8415-00-266-8677
Gloves, Cotton	8414-00-268-8330
Goggles	4240-00-203-0317
Respirator, Air-filtering	4240-00-022-2524

Materials/Parts:

(E20)	Abrasive Paper
(E21)	Abrasive Paper
(E22)	Methyl Ethyl Ketone (MEK)
(E23)	Adhesive
(E39)	Trichloroethane
(E57)	Primer

Personnel Required:

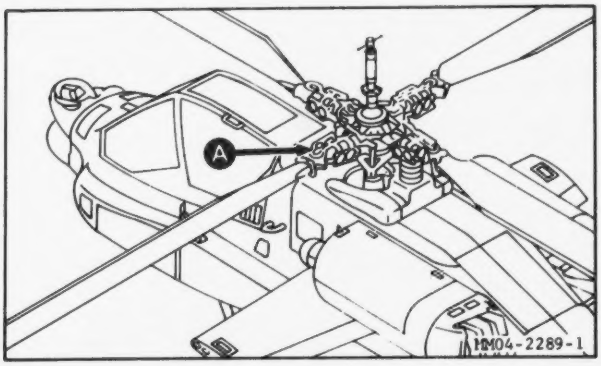
68G10	Aircraft Structural Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-PM

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access doors T250L, T250R, T290L, T290R, and L325 opened



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5-2-29. MAIN ROTOR PITCH HOUSING WIRE SUPPORT CLIP REPLACEMENT (AVIM) (cont) 5-2-29

A. REMOVAL

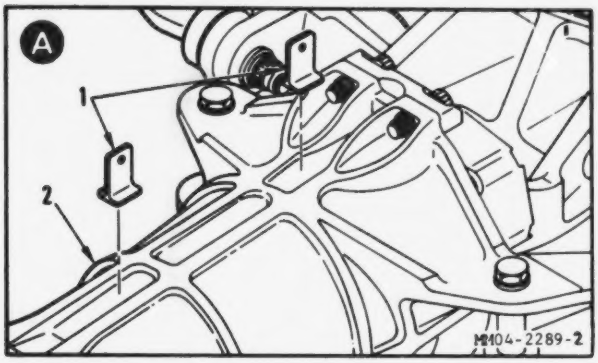
NOTE

This task is typical for all eight wire support clips.

WARNING

A heat gun can cause burns. Do not allow heat gun to contact skin. Wear protective equipment. If injury occurs, seek medical aid.

1. **Remove wire support clip (1) from** pitch housing (2). Apply only enough heat to remove clip (1) from pitch housing (2). Use heat gun.



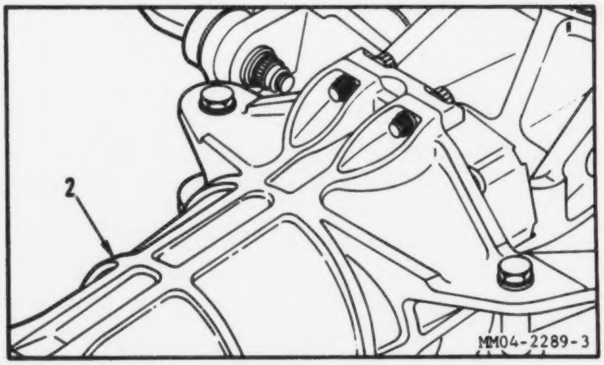
2. **Remove old adhesive.** Use abrasive paper (E20) followed by abrasive paper (E21).

WARNING

MEK is highly flammable and toxic. Use in well ventilated area and away from open flames. Breathing vapors could cause dizziness. If MEK comes in contact with eyes or skin, flush with water. If MEK comes in contact with eyes, or dizziness occurs, seek medical aid.

B. CLEANING

Wipe pitch housing clean. Use MEK (E22), apron, rubber gloves, and respirator (para 1-5-36).



C. INSPECTION

Check area of pitch housing that clip mounts on for damage. Maximum depth not to exceed 0.010 inch.

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5-2-29. MAIN ROTOR PITCH HOUSING WIRE SUPPORT CLIP REPLACEMENT (AVIM) (cont) 5-2-29

D. INSTALLATION

1. **Apply coat of primer to pitch housing (2), clip (1), and mounting area.** Use primer (E57). Clip (1) must be installed within 24 hours of application of primer. Wear apron, goggles, and rubber gloves.

WARNING

Trichloroethane is highly toxic. Use in a well ventilated area. Breathing vapors could cause dizziness. If trichloroethane comes in contact with eyes or skin, flush with water. If trichloroethane comes in contact with eyes or dizziness occurs, seek medical aid.

2. **Wipe clip (1) and housing (2) mating surface.** Use trichloroethane (E39). Wear goggles, gloves, and apron.

3. **Apply a thin, uniform layer of adhesive to pitch housing (2) and clip (1) mating surfaces.** Use adhesive (E23) and cotton gloves.

4. **Install clip (1) to pitch housing (2) and press firmly together.**

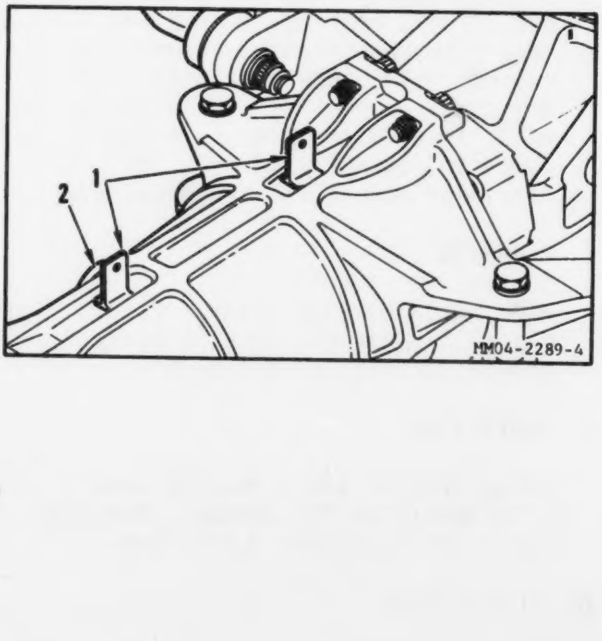
5. **Allow clip (1) to cure not less than 24 hours at room temperature or one hour at 190 to 210 °F (88 to 99 °C).**

6. **Check clip (1) after cure for loose mounting.**

7. **Inspect (TI).**

8. **Secure access doors T250L, T250R, T290L, T290R, and L325** (para 2-2-2).

9. **Inspect droop angle** (TM 55-1520-238-PM).



END OF TASK

5-2-30. MAIN ROTOR BLADE DROOP ANGLE MEASUREMENT 5-2-30

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-003-5267
Protractor Assembly	5220-00-212-8747
Aviation Ground Power Unit	1730-01-144-1897
Rigging Kit, Control System	1730-01-240-1577

Personnel Required:

68D10 Aircraft Powertrain Repairer (2)
One to assist

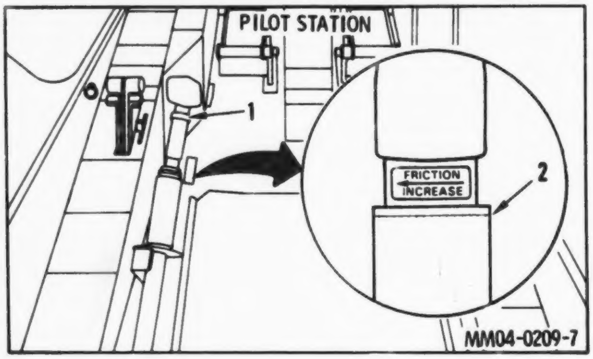
Equipment Conditions:

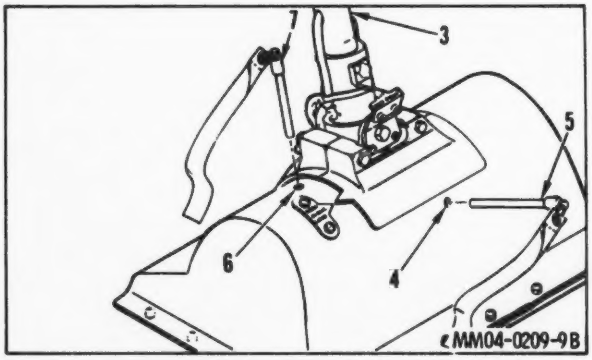
Ref	Condition
1-7-2	Helicopter safed
1-7-7	Rotor brake unlocked
1-7-18	External hydraulic power applied
2-2-2	Access doors T250L, T250R, T290L, T290R, and L325 opened
5-2-4	Opposite main rotor blade removed

WARNING

Application of hydraulic power could cause injury to personnel. Make certain all switches and controls are in safe condition before applying hydraulic power. Inform all persons working on helicopter that hydraulic power is to be applied.

1. **Enter pilot station (para 1-7-1). Observe all safety precautions.**
2. **Position collective stick (1) full down. Apply friction lock (2) fully counterclockwise.**
3. **Move pilot cyclic stick (3) to aline lateral rig pin holes (4).** Install -3 rig pin (5).
4. **Move pilot cyclic stick (3) to aline longitudinal rig pin holes (6).** Install -9 rig pin (7).





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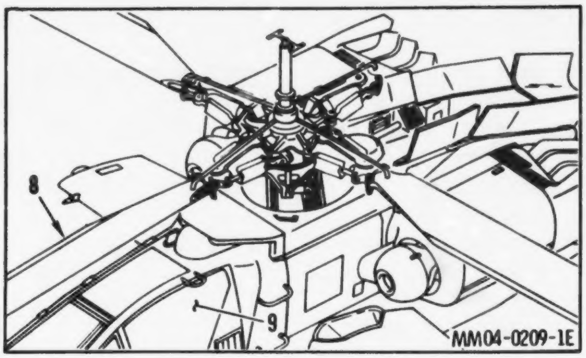
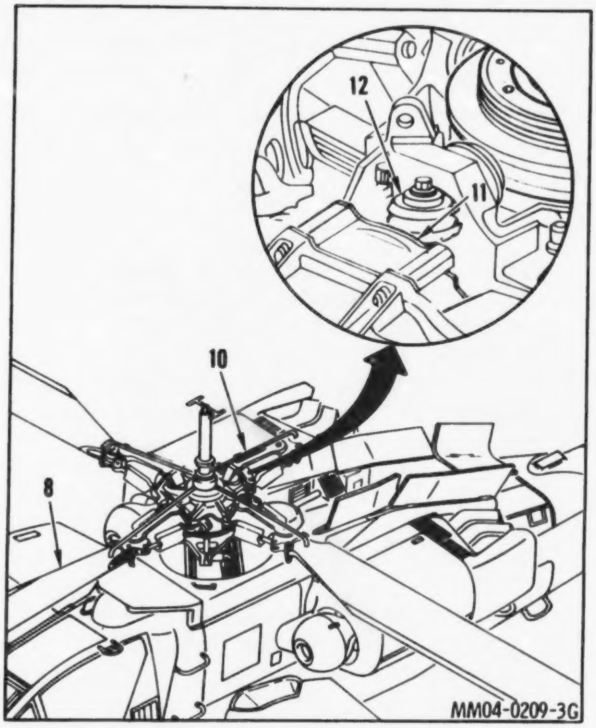
5. **Position main rotor blade (8) over forward fuselage (9).** Turn rotor by hand.



WARNING

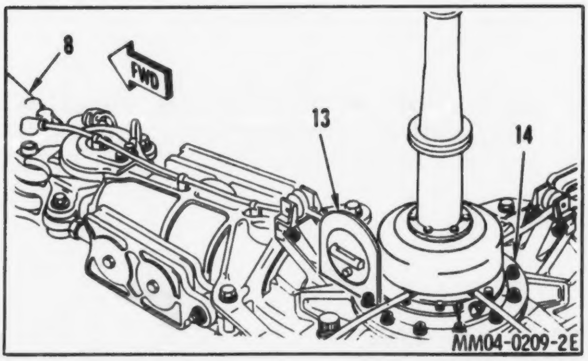
Hydraulic pressure applied to helicopter is 3000 psi. To prevent injury, ensure personnel are clear of upper controls. If injury occurs, seek medical aid.

6. **Raise pitch housing (10) opposite main rotor blade (8).** Ensure droop stop (11) does not touch roller (12).



7. **Place protractor (13) on main rotor hub (14).** Aline body of protractor (13) with main rotor blade (8).

8. **Adjust protractor (13) for zero.** This setting is to be used as reference point.



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5-2-30. MAIN ROTOR BLADE DROOP ANGLE MEASUREMENT (cont) 5-2-30

9. **Place protractor (13) on upper surface of outboard pitch housing (15).** Aline protractor (13) with main rotor blade (8).

10. **Adjust protractor inner dial to center level bubble.** This is droop angle reading and should be 7 to 7-1/2 DEGREES from reference zero point in step 8.

11. **If needed, adjust droop angle to** 7 to 7-1/2 DEGREES.

    a. If droop angle is too great, add shims (para 5-2-18).

    b. If droop angle is not enough, remove shims (para 5-2-18).

    c. One **0.020-INCH** thick shim changes droop about **1/2-DEGREE.**

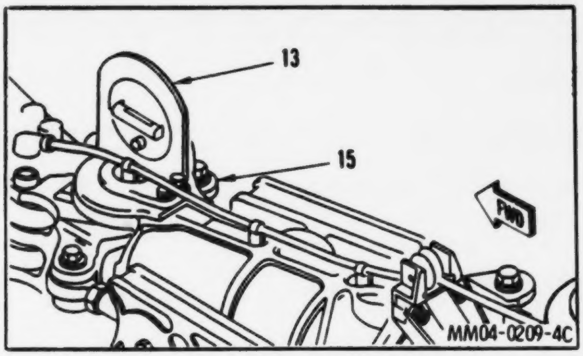
12. **Remove rig pins (5) and (7).**

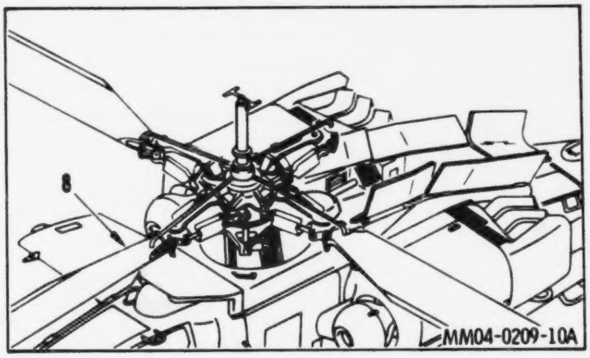
13. **Inspect (TI).**

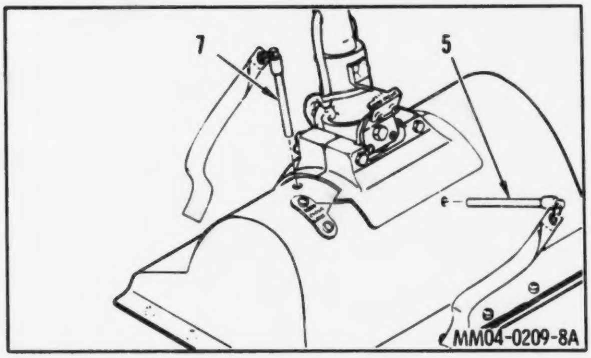
14. **Install opposite main rotor blade** (para 5-2-5).

15. **Disconnect external** hydraulic **power** (para 1-7-18).

16. **Secure access doors T250L, T250R, T290L, T290R, and L325** (para 2-2-2).







END OF TASK

5-2-31. MAIN ROTOR LOWER SEAL REPLACEMENT (AVIM) 5-2-31

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-003-5267
Kit, Sling Set	1730-01-246-6781
Setscrew (4)	5305-01-191-3114
Mallet, Rubber	5120-00-293-3399

Materials/Parts:

	Seal
(E5)	Grease

Personnel Required:

68D10	Aircraft Powertrain Repairer (3) Two to assist
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
5-2-17	Main rotor ground brush and brush holder removed

WARNING

Main rotor head weighs approximately 600 pounds. Use crane to turn rotor over. Failure to do so could result in serious injury. If injury occurs, seek medical aid.

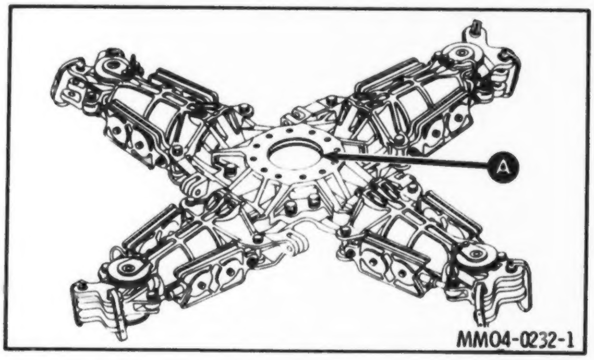
CAUTION

Do not allow pitch housings to be unsupported while turning over. Failure to do so will result in damage to strap packs and feathering bearings.

A. REMOVAL

1. **Position rotor head (1) flatside down on suitable support.**

2. **Remove four screw plugs (2).**



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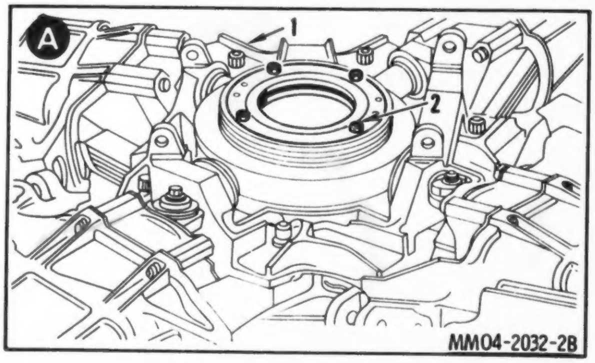

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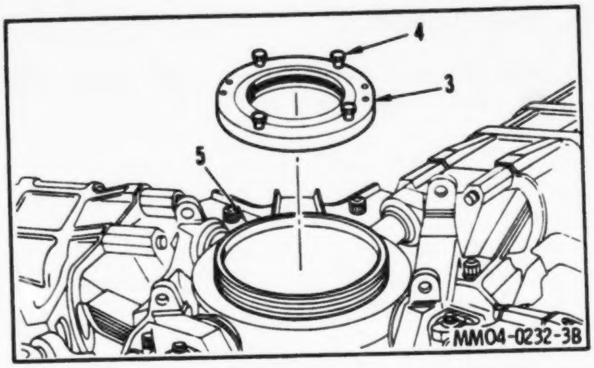
5-2-31. MAIN ROTOR LOWER SEAL REPLACEMENT (AVIM) (cont) 5-2-31



3. **Remove main rotor lower seal retainer (3).**

   a. Install four set screws (4). Tighten screws until they bottom against lower bearing.

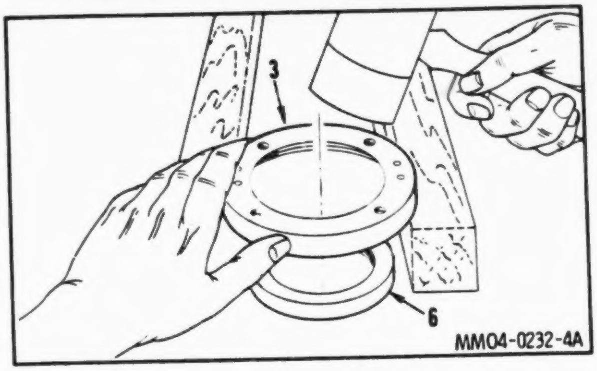
   b. Continue tightening each set screw 1/2 turn until retainer (3) is free of hub (5).

   c. Remove four set screws (4) from retainer (3).

4. **Remove and discard main rotor lower seal (6) from seal retainer (3).**

   a. Support retainer (3), curved side down, on blocks.

   b. Tap around end of seal (6) until seal (6) drops from retainer (3). Use rubber mallet.



B. CLEANING

Remove grease from lower seal retainer and hub (para 1-5-36).

C. INSPECTION

1. **Check lower seal retainer for nicks, scratches, and gouges.** Damage not to exceed 0.032 MAX.

2. **Check lower seal retainer for corrosion** (para 1-5-38).

3. **Check retainer for distortion.** Lower surface to be flat within 0.030 inch.

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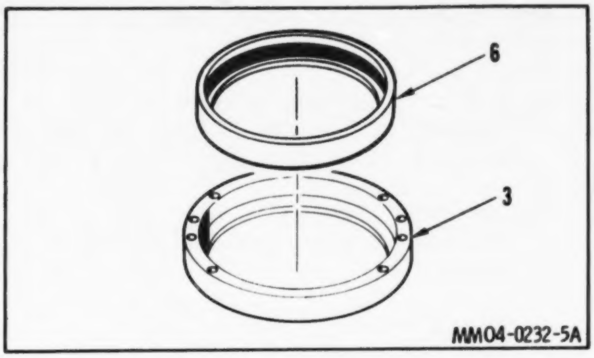
D. INSTALLATION

1. **Install new main rotor lower seal (6) in seal retainer (3).**

   a. Position seal (6) on top of retainer (3) with curved side up.

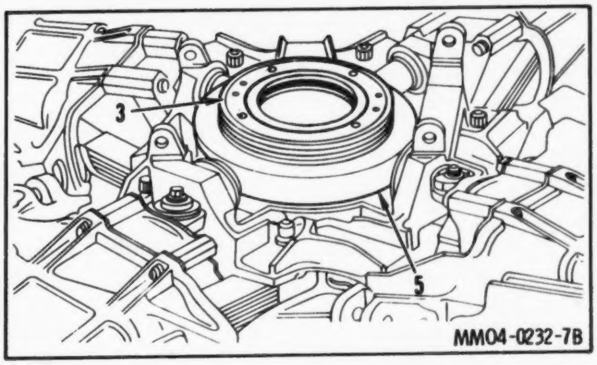
   b. Tap seal (6) in circular direction until seal is seated in retainer (3).



2. **Pack hub (5) with grease (E5) to upper surface of bearing cup.**

CAUTION

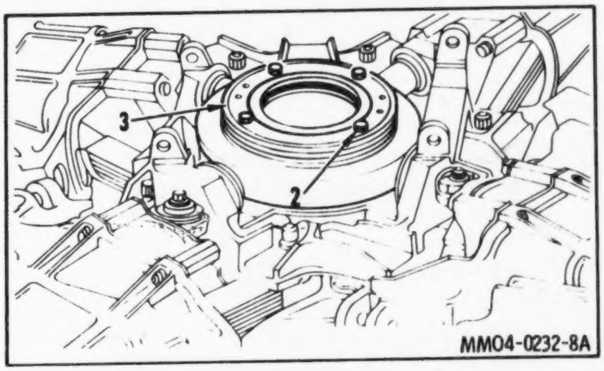
Ensure that seal lip is properly positioned.



3. **Install main rotor lower seal retainer (3) in hub (5).**

   a. Position retainer (3), with curved side down, in hub (5).

   b. Tap retainer (3) with mallet in circular direction until seated in hub (5). Use rubber mallet.



4. **Install four screw plugs (2) in retainer (3).**

5. **Inspect (TI).**

6. **Install main rotor ground brush and brush holder** (para 5-2-17).

END OF TASK

5-2-32. MAIN ROTOR HEAD DISASSEMBLY (AVIM) 5-2-32

This task covers: A. DISASSEMBLY B. CLEANING C. INSPECTION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-003-5267
Wrench, Strap	5120-00-242-3249
Handle, Slide, T-Style, 3/4 Drive	5120-00-099-8544
Adapter, 3/4, 1/2 Drive	5120-00-227-8088
Sling Assembly, Universal	1730-01-166-3543
Socket, 1-1/16, 1/2 Drive	5120-00-935-7427
Shears, Metal Cutting	5110-00-273-0128

Materials/Parts:

(E102)	Tongue Depressor (2)

Personnel Required:

68D10	Aircraft Powertrain Repairer (2) One to assist
66R30	Inspector/Supervisor

Equipment Conditions:

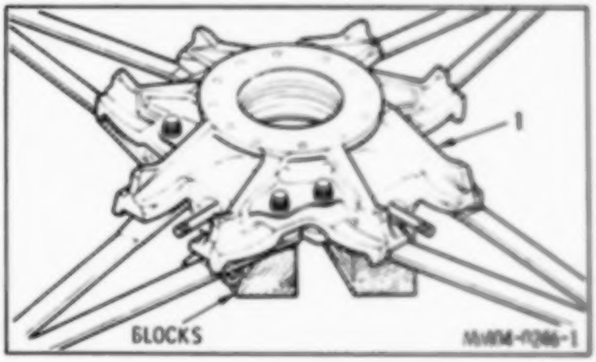
Ref	Condition
5-2-11	Main rotor head removed
5-2-23	Main rotor pitch housings removed
5-2-26	Main rotor feathering bearing housings removed

A. DISASSEMBLY

WARNING

Main rotor head weighs approximately 600 pounds. Use crane to lift rotor head. Failure to do so could result in serious injury. If injury occurs, seek medical aid.

1. **Place head assembly (1) on wood blocks.** Use sling.



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5-2-32. MAIN ROTOR HEAD DISASSEMBLY (AVIM) (cont) 5-2-32

2. Remove hub (2) from lower shoe (3).

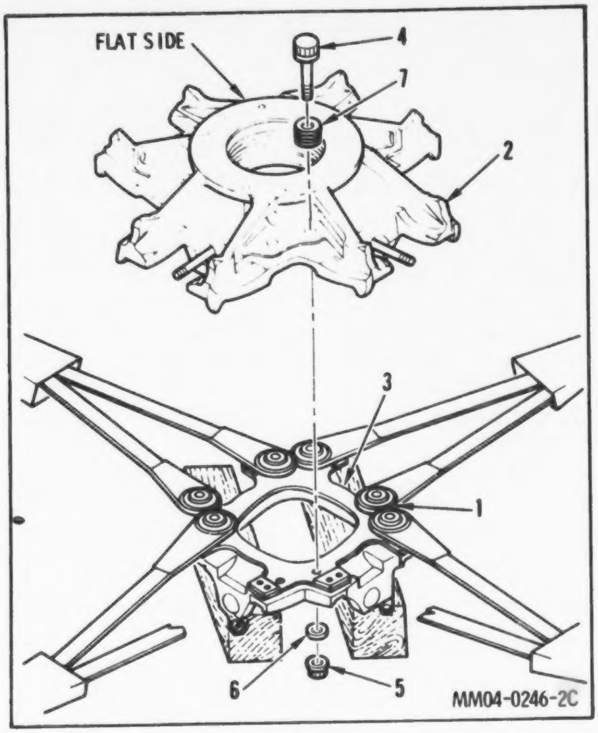
a. Hold eight bolts (4).

b. Remove eight nuts (5) and washers (6). Use 3/4 drive handle, adapter, and 1-1/16 socket.

c. Remove eight bolts (4) and preload indicating washers (7). Discard washers (7).

d. Lift hub (2) from lower shoe (3).

e. Place hub (2), flat side down, on work bench.


FLAT SIDE
4
7
2
3
1
6
5
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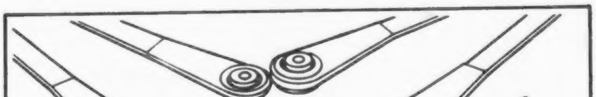
3. Remove four stretch straps (8), spacers (9), lower plate (10) from lower shoe (11).


8
9
10
11
BLOCKS
MM04-0246-4D

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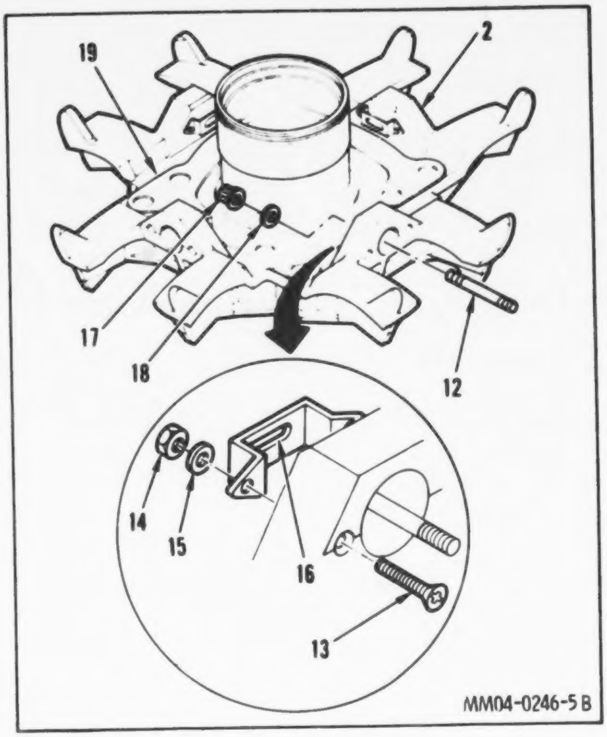
4. **Remove four feathering bearing studs (12) from hub (2).**
   a. Hold eight screws (13).
   b. Remove eight nuts (14) and washers (15).
   c. Remove eight screws (13) and four retainers (16).
   d. Hold four studs (12). Use strap wrench.
   e. Remove four nuts (17) and washers (18).
   f. Remove studs (12) from hub (2).
5. **Remove upper plate (19) from hub (2).**



B. CLEANING

Wipe upper plate, hub, stretch straps, lower plate, shoe retainers, studs, and all related hardware with a clean rag.

C. INSPECTION

1. **Check upper plate, hub, lower plate, shoe, four retainers, four studs, and all related hardware for cracks, wear, thread damage, scoring, hole elongation, and missing data plate.** Check all mating surfaces for wear. None allowed.
2. **Check upper plate, hub, stretch straps, lower plate, shoe, for corrosion.** None allowed.
3. **Check stud shank for corrosion. 0.005 INCH maximum.**
4. **Check eight holes of hub, lower shoe, upper and lower plates, for elongation or surface damage.** None allowed.
5. **Check strap packs for damage and repair** (para 5-2-24).
6. **Inspect (TI).**

END OF TASK

5-2-33. MAIN ROTOR HEAD REASSEMBLY (AVIM) 5-2-33

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-003-5267
Wrench, Strap	5120-00-242-3249
Handle, Slide, T-Style 3/4 Drive	5120-00-099-8544
Adapter, 3/4, 1/2 Drive	5120-00-227-8088
Sling Assembly Universal	1730-01-166-3543
Wrench, Torque, 1/4 Drive	5120-00-117-4832
Wrench, Torque 3/8 Drive	5120-00-821-3441
Socket, 1-1/16, 1/2 Drive	5120-00-935-7427
Scriber, Machinist's 1 to 9 inches	5120-00-221-7063

Materials/Parts:

	Washers (8)
(E14)	Solid Film Lubricant
(E54)	Preservative

Personnel Required:

68D10	Aircraft Powertrain Repairer (2) One to assist
66R30	Inspector/Supervisor

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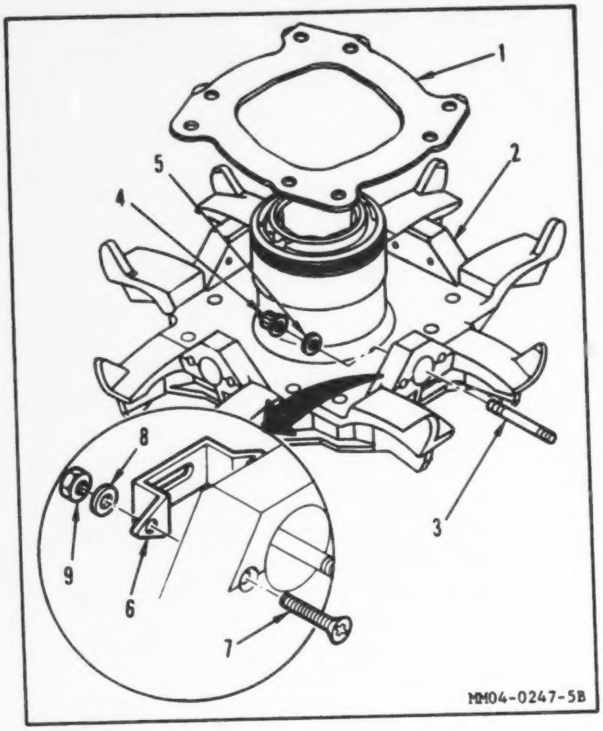
5-2-33. MAIN ROTOR HEAD REASSEMBLY (AVIM) (cont)



1. **Install upper plate (1) in hub (2).**

NOTE

Allow studs 6 hours to dry after applying lubricant to threads.

2. **Install four studs (3) in hub (2).**

   a. Lubricate threads of four studs (3) and nuts (4). Use solid film lubricant (E14). Coat four studs (3) with preservative (E54).

   b. Install keyed end of four studs (3) into hub (2).

   c. Hold four studs (3). Use strap wrench.

   d. Install four washers (5) and nuts (4).

3. **Install four retainers (6) on hub (2).**

   a. Aline four retainers (6) with hub (2) mounting holes and key of studs (3).

   b. Install eight screws (7).

   c. Install eight washers (8) and eight nuts (9).

   d. Hold eight screws (7). Torque eight nuts (9) to **20 INCH-POUNDS.**

GO TO NEXT PAGE

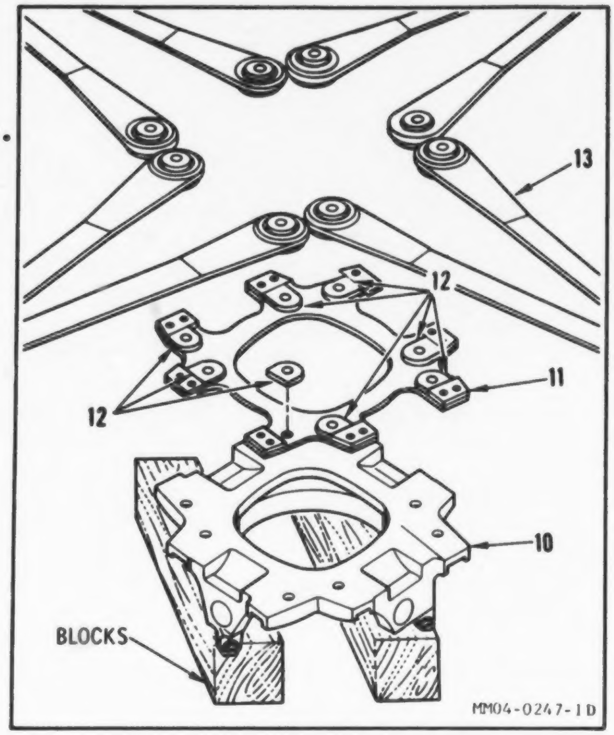
4. **Assemble lower shoe (10), lower plate (11), spacers (12) and four stretch strap packs (13).**

   a. Place lower shoe (10) on wood blocks.

   b. Place lower plate (11) on lower shoe (10) and aline bolt holes.

   c. Place eight spacers (12) on lower plate (11) to aline bolt holes.

   d. Place stretch strap packs (13) on spacers (12) and aline bolt holes.



WARNING

Hub assembly weighs approximately 200 pounds. Use crane to lift assembly. Failure to do so could result in serious injury. If injury occurs, seek medical aid.

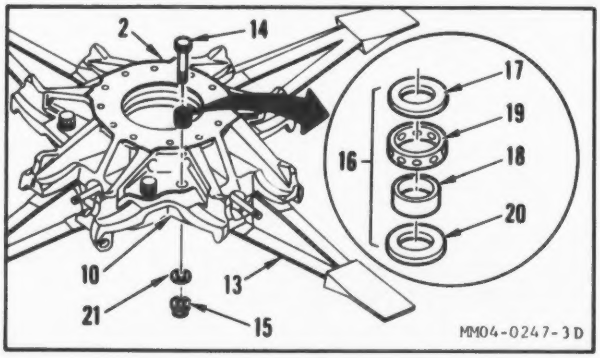
5. **Assemble main rotor hub (2) and lower shoe (10).**

   a. Place hub (2) on stretch strap packs (13) and aline bolt holes.

NOTE

Allow bolts 6 hours to dry after coating with lubricant.

   b. Lubricate eight bolts (14) and threads of nuts (15). Use solid film lubricant (E14).



6. **Install eight new preload indicating washer assemblies (16) in proper sequence on eight bolts (14).** Install washer (17), inner washer (18), outer washer (19), and washer (20).

7. **Install eight bolts (14) with preload indicating washer assemblies (16) through hub (2) and lower shoe (10).**

8. **Install eight washers (21) and nuts (15) on bolts (14).** Torque nuts (15) to 40 FOOT POUNDS.

GO TO NEXT PAGE

9. **While holding strap pack (13) in horizontal position, measure and record gap between each leg (22) of strap pack (13) and lower plate (11).** Identify any gap that measures .010 INCH or less, and go to step 11.

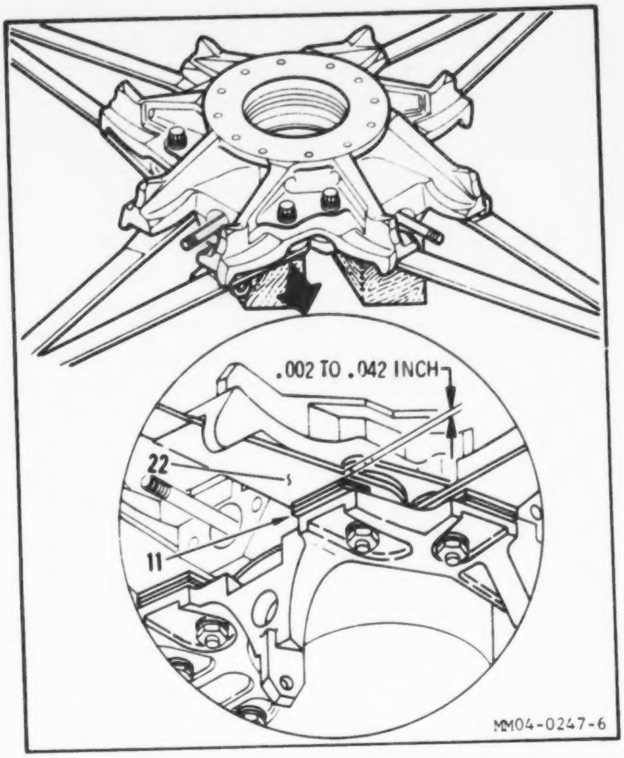
10. **If all gap measurements are greater than .010 INCH, go to step 12.**

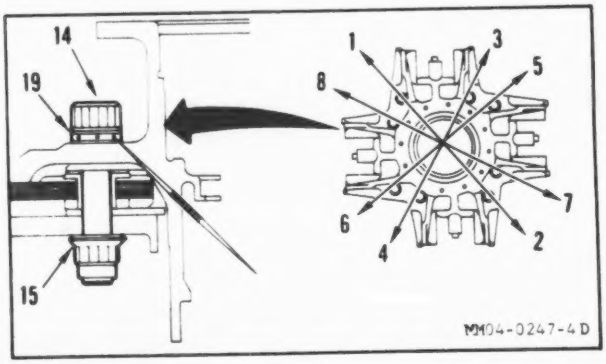
NOTE

- No more than two spacers (12) may be installed at any single bolt hole.
- Preload indicating washers will be reused if torque did not exceed the 40 foot-pounds of step 8.

11. **Install second spacer (12) at any gap identified in step 9, above.**
    a. Remove eight nuts (15), washers (21), preload indicating washer assemblies (16), and bolts (14).
    b. Separate hub (2) from strap packs (13).
    c. Install second spacer (12) between strap pack leg (22) and original spacer (12).
    d. Repeat steps 4 through 9.

12. **Torque eight nuts (15) using preload indicating washer torquing method.** Torque nuts in a criss-cross manner until correct torque is reached.
    a. Hold eight bolts (14).
    b. Insert scriber into hole in outer washer (19).





CAUTION

Do not continue to tighten nut after preload indicating washer no longer turns. You will damage preload indicating washer, bolt, and nut. Preload indicating washer, bolt, and nut must be replaced if over-torque occurs.

GO TO NEXT PAGE

c. Tighten eight nuts (15), 1/8 turn at a time while turning outer washer (19). Use 3/4 drive handle, adapter, and 1-1/16 socket.

NOTE

You have the correct torque when outer washer (19) no longer turns.

d. Continue to tighten eight nuts (15) until all eight nuts (15) are correctly torqued.

NOTE

If any gap measurement is not between .002 to .042 INCH perform disassembly and inspection (para 5-2-32).

13. **Measure gap between each leg (22) and lower plate (11). Gap must be .002 to .042 INCH.**

NOTE

If Dimension A is less than **9.235 INCH**, perform disassembly and inspection (para 5-2-32).

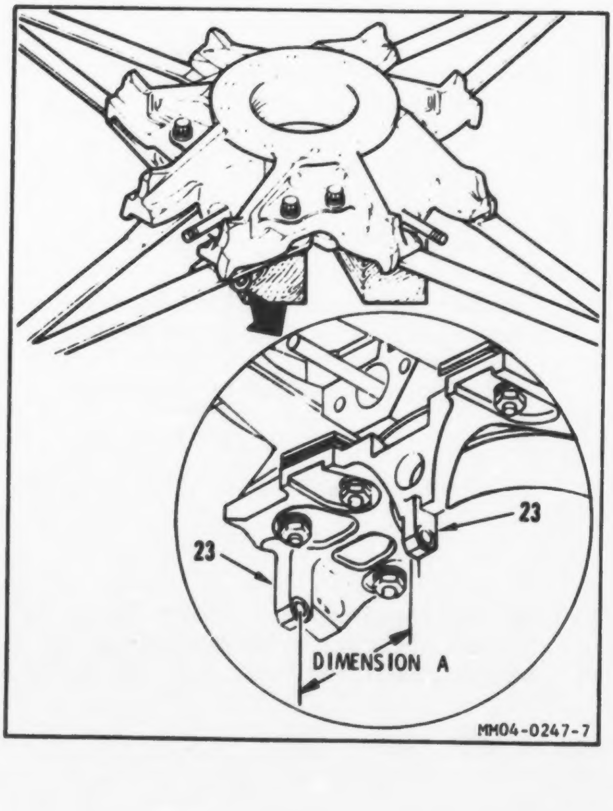
14. **Measure distance between inboard surfaces of scissor mounting lugs (23) (Dimension A).** Distance must be at least **9.235 INCH.**

15. **Inspect (TI).**

16. **Install main rotor feathering bearing housing** (para 5-2-26).

17. **Install main rotor pitch housings** (para 5-2-25).

18. **Install main rotor head** (para 5-2-12).



END OF TASK

5-2-34. MAIN ROTOR DROOP STOP FOLLOWER REMOVAL (AVIM) 5-2-34

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-003-5267
Kit, Sling Set	1730-01-193-9857

Personnel Required:

68D10 Aircraft Powertrain Repairer

Equipment Conditions:

Ref	Condition
5-2-26	Main rotor feathering bearing housing removed

WARNING

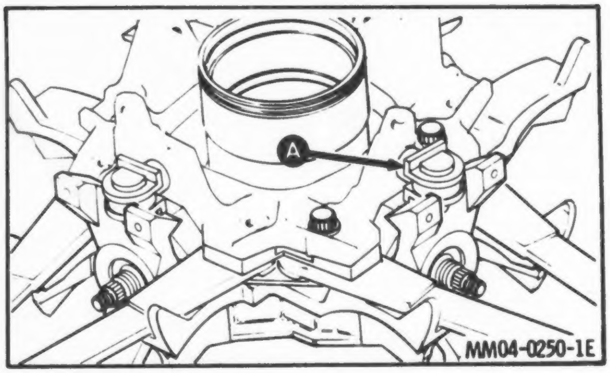
Main rotor head weighs approximately 600 pounds. Use crane to turn rotor over. Failure to do so could result in serious injury. If injury occurs, seek medical aid.

A. REMOVAL

CAUTION

Do not allow strap pack to remain unsupported when inverting main rotor. Failure to do so will result in damage to strap pack.

1. **Invert main rotor head (1) on wood blocks.** Use sling.



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5-2-34. MAIN ROTOR DROOP STOP FOLLOWER REMOVAL (AVIM) (cont) 5-2-34

2. Remove droop stop follower (3) from lower shoe (5).

a. Push in on follower (3) to relieve spring tension on retaining ring (6).

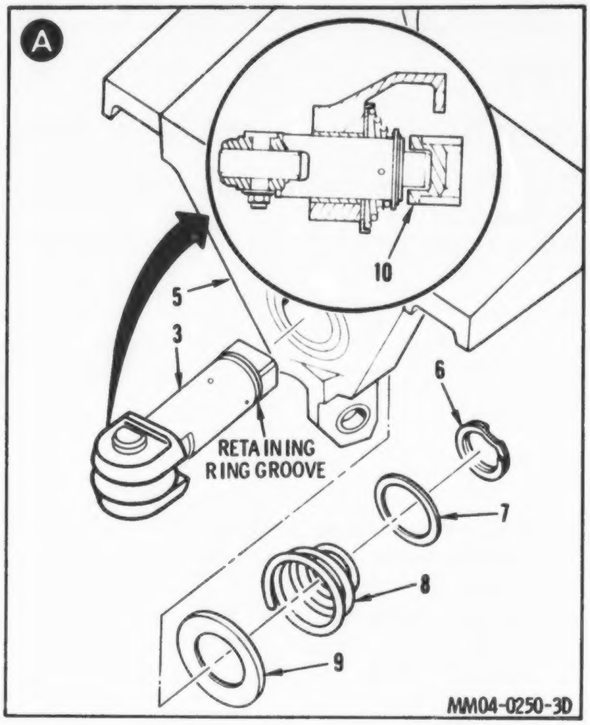
WARNING

Droop stop follower is under approximately 50 pounds of spring tension. Use caution when removing retaining ring to avoid injury to personnel. If injury occurs, seek medical aid.

b. Remove retaining ring (6) from follower (3).

c. Remove washer (7), spring (8), and cup (9) from follower (3).

d. Remove follower (3) from lower shoe (5).



NOTE

When all four droop stop followers are removed, the droop stop ring will be free of main rotor head.

3. **For droop stop ring (10) removal, remove three remaining droop stop followers (3).** Droop stop ring (10) can be lifted free of main rotor head (1).

B. **CLEANING**

Wipe droop stop follower, lower shoe, retaining ring, washer, spring, cup, and droop stop ring if removed, with a clean rag.

C. **INSPECTION**

1. **Check droop stop follower, droop stop plunger, droop stop roller, striker plate, lower shoe, retaining ring, washer, spring, cup, and droop stop ring, if removed, for cracks, wear, galling, scoring, and elongation** (para 5-2-1).
2. **Check droop stop follower, droop stop plunger, droop stop roller, striker plate, retaining ring, washer, spring, cup, and droop stop ring for corrosion.** Maximum depth 0.005 (para 1-5-38).
3. **Check lower shoe for corrosion.** None allowed.

END OF TASK

5-2-35. MAIN ROTOR DROOP STOP FOLLOWER INSTALLATION (AVIM) 5-2-35

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-003-5267
Kit, Sling Set	1730-01-193-9857

Personnel Required:

68D10	Aircraft Powertrain Repairer (2) One to assist
66R30	Inspector/Supervisor

Materials/Parts:

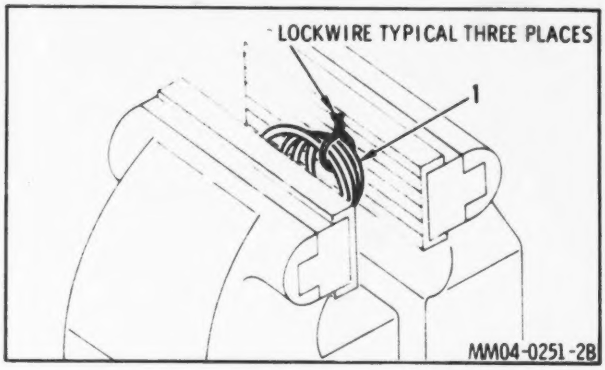
(E3) Lockwire

---

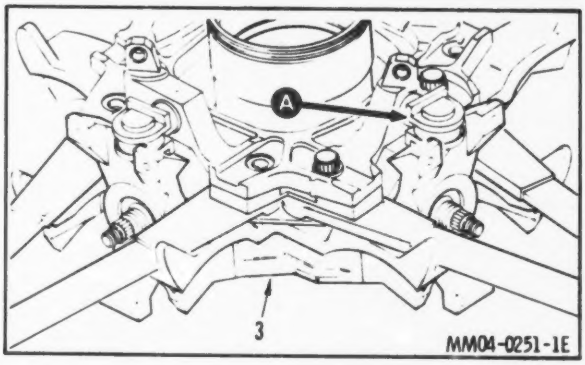
1. **Wrap lockwire (E3) around spring (1) at three places.** Evenly space lockwire to hold spring fully compressed.

2. **Position spring (1) in vise and fully compress.** Tighten lockwire.

3. **Remove spring (1) from vise.**



4. **Place droop stop ring (2) in position on main rotor head (3).**



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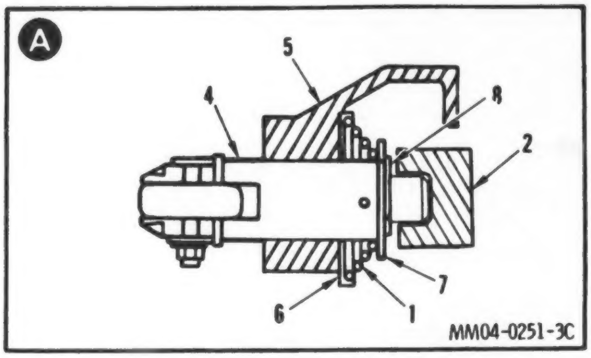
5-2-35. MAIN ROTOR DROOP STOP FOLLOWER INSTALLATION (AVIM) (cont) 5-2-35

CAUTION

To prevent contamination of Teflon-type journal bearings, do not apply lubricant on droop stop followers or journal bearings.



6. **Install droop stop follower (4) in lower shoe (5).**
   a. Install follower (4) partially into lower shoe (5).
   b. Place cup (6) between lower shoe (5) and ring (2), with flange facing ring (2), spring (1), and washer (7).
   c. Insert follower (4) through cup (6), spring (1), and washer (7).
   d. Install retaining ring (8) on droop stop follower (4).
7. **Install remaining droop stop followers (4) (if required).** Repeat step 6 for each follower (4).
8. **Remove lockwire from spring (1).**
9. **Allow a minimum gap of 0.015 inch between retaining ring (8) and droop ring (2).**
10. **Inspect (TI).**
11. **Turn main rotor head over.** Use sling.
12. **Install main rotor feathering bearing housing** (para 5-2-26).

END OF TASK

5-2-36. MAIN ROTOR DROOP STOP FOLLOWER REPAIR (AVIM) 5-2-36

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-033-5267

Personnel Required:

68D10	Aircraft Powertrain Repairer
66R30	Inspector/Supervisor

Materials/Parts:

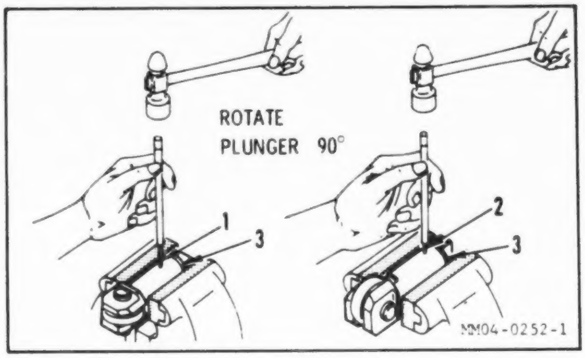
(E19) Primer

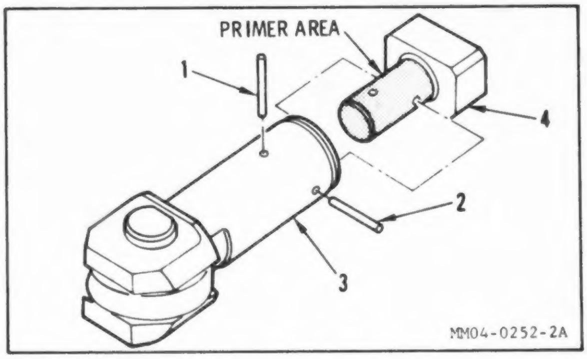
A. REMOVAL

CAUTION

Place metal jaw protectors on vise to protect droop stop followers from scratches and dents.

1. Put droop stop follower in vise.
2. Remove pins (1) and (2) from plunger (3).
3. Remove ring follower (4) from plunger (3).





B. CLEANING

Wipe plunger and follower with a clean rag.

C. INSPECTION

Check plunger and follower for damage (para 5-2-1).

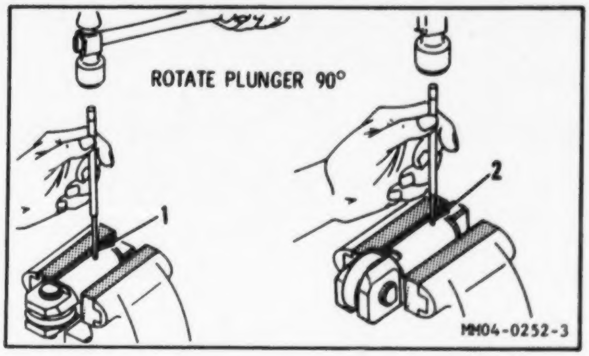
D. INSTALLATION

1. Apply primer (E19) to mating surface of replacement ring follower (4). Use primer (E19). Insert follower (4) in plunger (3) while primer is wet.
2. Aline holes in ring follower (4) with holes in plunger (3).
3. Install pins (1) and (2) in plunger (3).

GO TO NEXT PAGE

5-2-36. MAIN ROTOR DROOP STOP FOLLOWER REPAIR (AVIM) (cont) 5-2-36

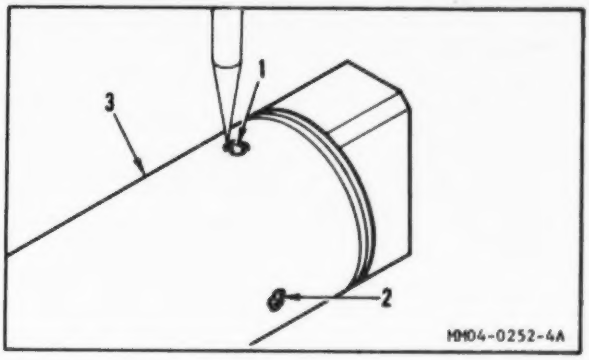
4. Drive pins (1) and (2) in until approximately 1/16-INCH below surface of plunger (3).


ROTATE PLUNGER 90°
1
2
MM04-0252-3

5. Secure pins (1) and (2) by staking both ends at four equally spaced places on plunger (3).

6. Inspect (TI).

7. Install droop stop follower (para 5-2-35).


1
2
3
MM04-0252-4A

END OF TASK

5-2-37. MAIN ROTOR BLADE STATIC DISCHARGER REPLACEMENT 5-2-37

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

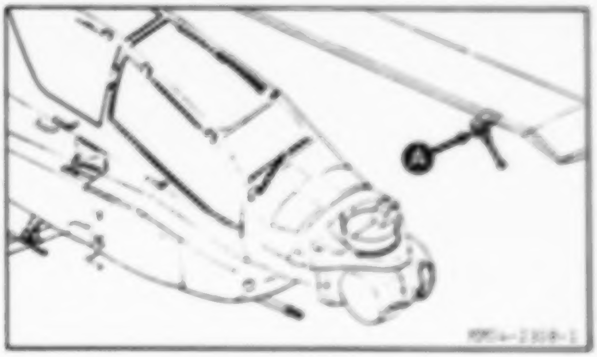
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Electrician	5180-00-323-4915
Wrench, Strap	5120-00-242-3249

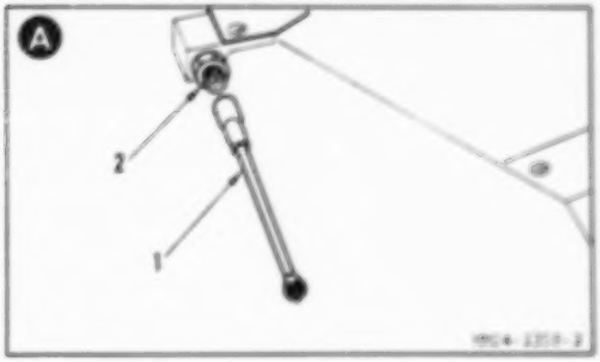
Personnel Required:

68F10 Aircraft Electrician

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed





A. REMOVAL

Remove static discharger (1) from stud (2). Hold stud (2). Use strap wrench.

B. CLEANING

Wipe stud with a clean rag.

C. INSPECTION

Check stud for cracks and deformation. None allowed.

D. INSTALLATION

Install static discharger (1) on stud (2). Hold stud (2). Use strap wrench.

END OF TASK

5-2-38. MAIN ROTOR BLADE PHASE ADJUSTMENT 5-2-38

This task covers: A. CHECKING PHASE ADJUSTMENT B. ADJUSTMENT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-323-4876
Aviation Ground Power Unit (AGPU)	1730-01-144-1897
Rigging Kit, Control System	1730-01-181-9270
Protractor	5120-00-212-8747
Accessory Kit, Rotor Track and Balance	4920-01-180-7610
Platform, Maintenance	1730-00-294-8883

Materials/Parts:

(E15) Lockwire
(E34) Lockwire

Personnel Required:

68D10	Aircraft Powertrain Repairer (2) One to assist
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T
Collective flight controls rigging operational check performed
Cyclic flight controls rigging operational check performed

Equipment Conditions:

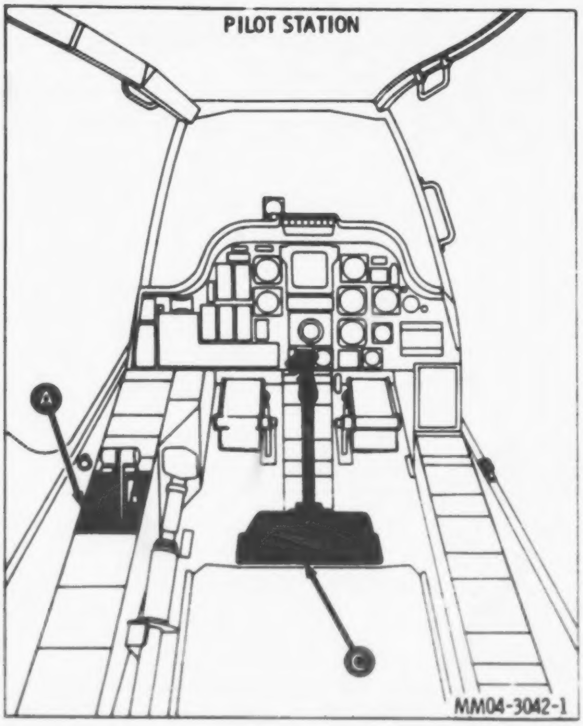
Ref	Condition
1-7-2	Helicopter safed
1-7-18	External power applied - hydraulic (primary)

GO TO NEXT PAGE

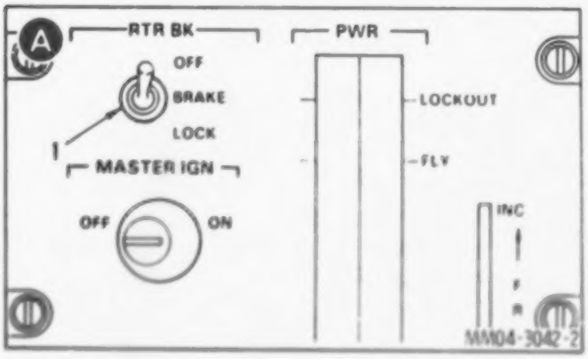
5-2-38. MAIN ROTOR BLADE PHASE ADJUSTMENT (cont) 5-2-38

A. CHECKING PHASE ADJUSTMENT

1. Enter pilot station (para 1-7-1). Observe all safety precautions.


PILOT STATION
A
C
MM04-3042-1

2. Set RTR BK switch (1) to OFF.


A
RTR BK
OFF
BRAKE
LOCK
1
MASTER IGN
OFF
ON
PWR
LOCKOUT
FLY
INC
F
R
MM04-3042-2

GO TO NEXT PAGE

5-2-38. MAIN ROTOR BLADE PHASE ADJUSTMENT (cont) 5-2-38

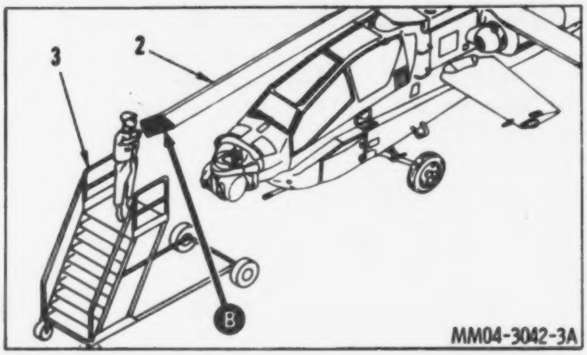
3. **Position main rotor blade (2) to be phased over nose of helicopter.**

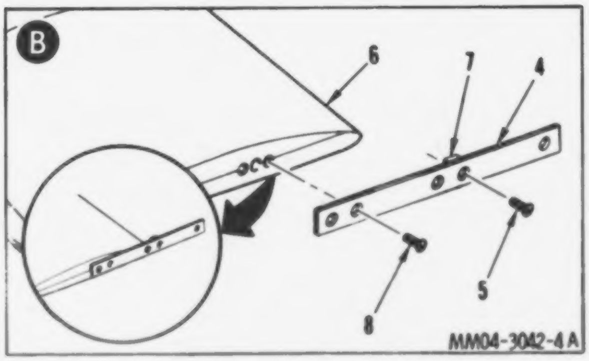
4. **Place maintenance stand (3) under tip of main rotor blade (2).** Install phasing target (4).

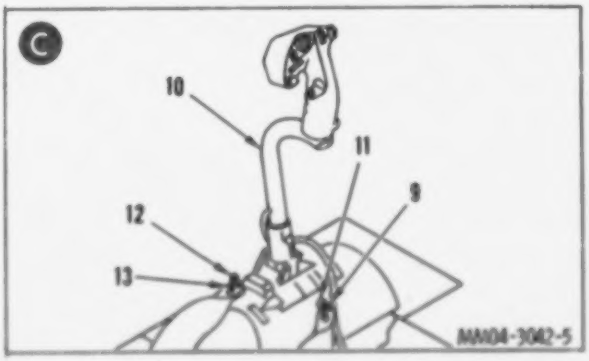
   a. Remove screws (5) from tip cap (6). Install screws in nut plates (7) on target (4).

   b. Install target (4) on tip of main rotor blade (2), using two screws (8) from blade phasing kit.

5. **Repeat step 4 for remaining main rotor blades.**







6. **Install -5 rig pin (9) in pilot cyclic stick (10) lateral rig pin hole (11).**

7. **Install -9 rig pin (12) in pilot cyclic stick (10) longitudinal rig pin hole (13).**

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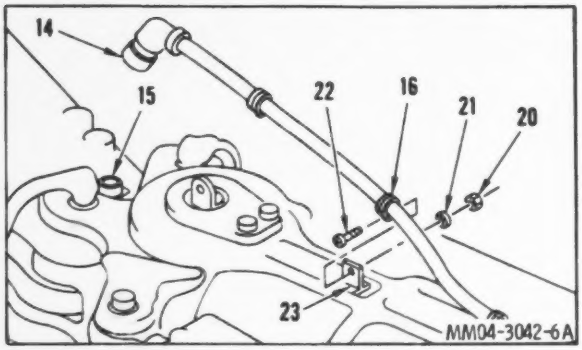
8. **Remove lockwire.** Detach connectors P1, P2, P3, and P4 (14) from main rotor blade connectors J1 (15).

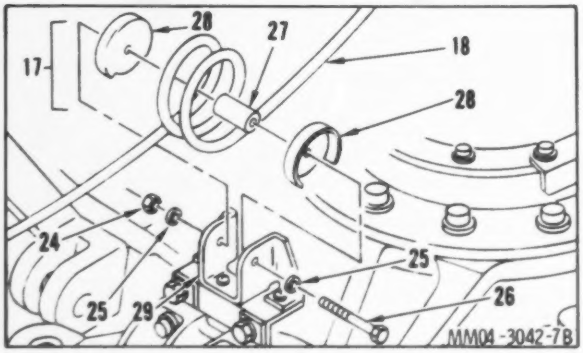


9. **Remove three clamps (16) and one wire guide (17).** Secure cable (18) to mast (19).

   a. Remove nuts (20), washers (21), and screws (22) from three clamps (16) and clips (23).

   b. Remove nut (24), two washers (25), screw (26), spacer (27), and two guides (28) from bracket (29).

   c. Secure cable (18) to mast (19). Use lockwire (E15).



10. **Repeat steps 8 and 9 for remaining rotor blades.**

11. **Position blade to be adjusted over nose of helicopter.**

12. **Install telescope support (30) and tighten knurled nut (31).**

   a. Place telescope support (30) over mast (19) attach support (30) to drive plate (32).

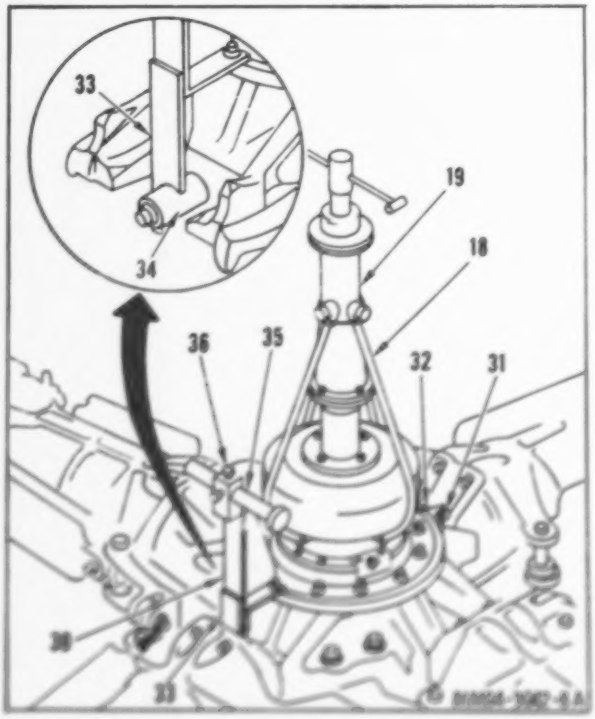
   NOTE

   Finger on telescope support must contact feather bearing bushing of pitch housing 90 degrees to blade being phased.

   b. Rotate support (30) until finger (33) contacts fecher bearing bushing (34).

   c. Tighten knurled nut (31).

13. **Install telescope (35) in upport (30). Tighten thumbscrew (36).**



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5-2-38. MAIN ROTOR BLADE PHASE ADJUSTMENT (cont) 5-2-38

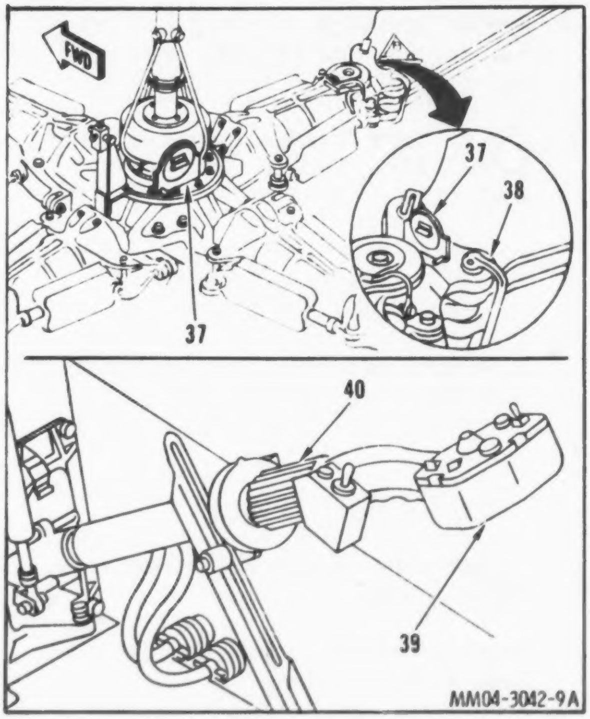
14. **Grasp blade (2) at tip and swing slightly forward and aft. Release blade (2) tip and allow blade to settle.**

15. **Place propeller protractor (37) on plate (32). Adjust zero.**

CAUTION

To prevent damage to flight control system do not use force if binding or roughness occurs while moving controls with hydraulic power.

16. **Place protractor (37) on lead-lag link (38).** Slowly raise pilot collective stick (39) until protractor (37) indicates level. Apply collective friction by rotating collar (40).

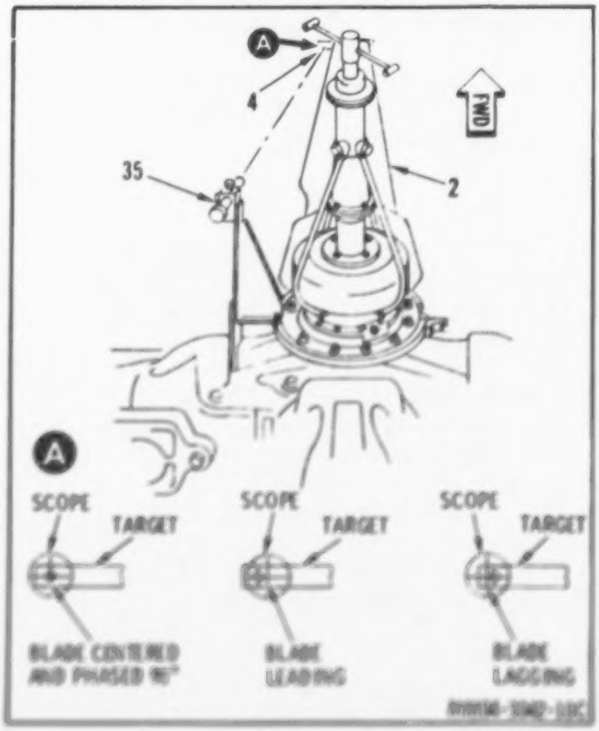

FWD
37
38
37
40
39
MM04-3042-9A

17. **View target (4) through telescope (35).**

    a. If target (4) is centered in telescope (35) cross hairs +0.30-inch, blade is in phase. Repeat steps 10 thru 16 for remaining blades.

    b. If target (4) is over 0.30-inch to left of telescope (35) (leading) cross hairs adjust dampers (part B phase adjustment).

    c. If target (4) is over 0.30-inch to right of telescope (35) (lagging) cross hairs, adjust dampers (part B phase adjustment).


A
4
FWD
35
2
A
SCOPE
TARGET
BLADE CENTERED AND PHASED 90°
SCOPE
TARGET
BLADE LEADING
SCOPE
TARGET
BLADE LAGGING
MM04-3042-10C

GO TO NEXT PAGE

5-2-38. MAIN ROTOR BLADE PHASE ADJUSTMENT (cont) 5-2-38

18. **Remove telescope (35) from support (30).**

    a. Loosen knurled nut (36).

    b. Remove telescope (35).

19. **Remove support (30) from plate (32).**

    a. Loosen knurled nut (31).

    b. Remove support (30) from plate (32).

20. **Remove four targets (4).**

    a. Place stand (3) under blade (2) tip.

    b. Remove two screws (8) and target (4).

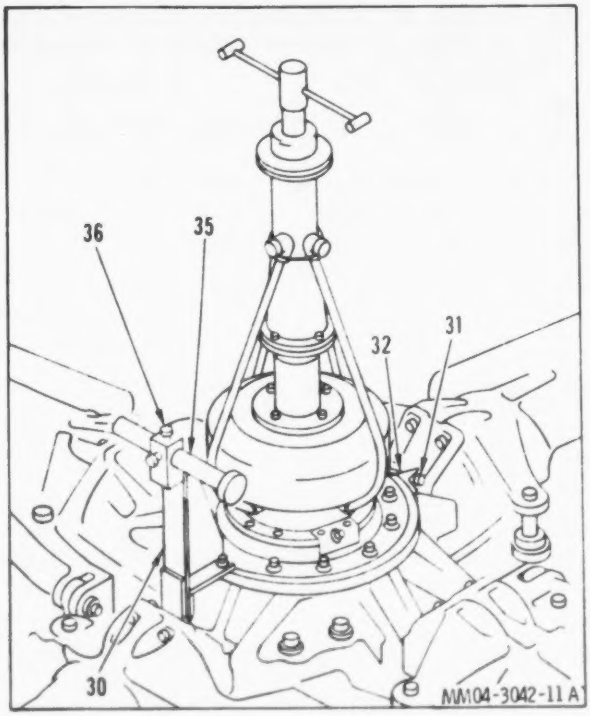
    c. Remove two screws (5) from nut plates (7) on target (4). Install screws (5) in blade tip cap (6).

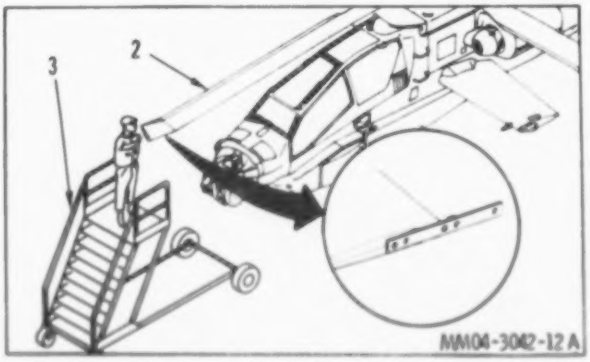
21. **Lower collective stick (39).**

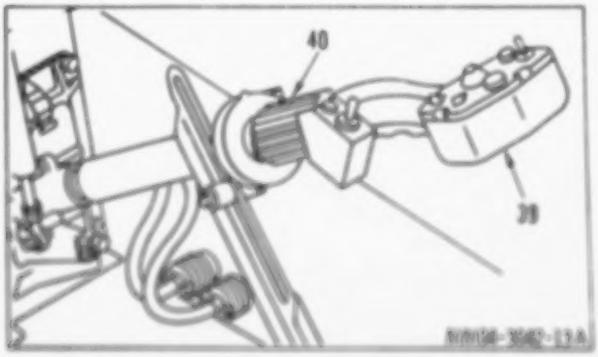
    a. Rotate pilot collective stick (40) collar to zero.

    b. Move stick (39) full down.

    c. Rotate collar (40) to apply friction.







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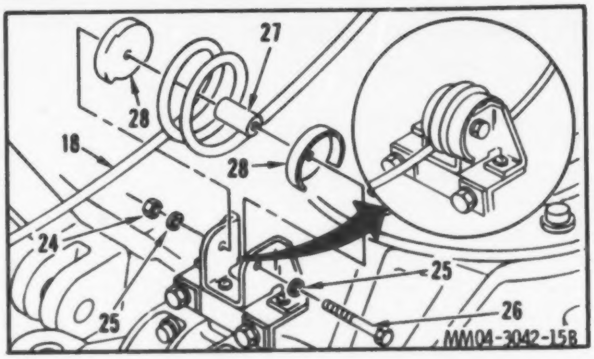
5-2-38. MAIN ROTOR BLADE PHASE ADJUSTMENT (cont) 5-2-38



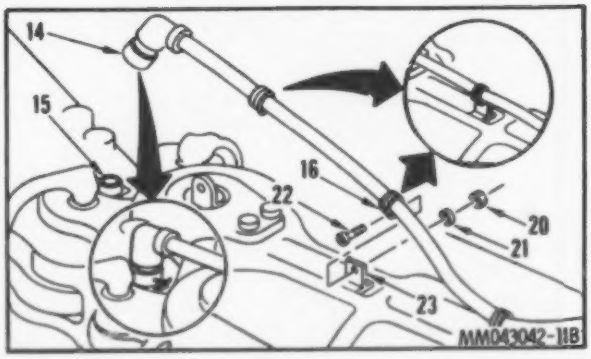
22. Attach de-icing cables P1, P2, P3, and P4 (18) to main rotor blade connectors J1 (15).

a. Remove lockwire securing cable (18).

b. Install screws (26), two washers (25), spacer (27), two guides (28) and nuts (24) through three clips..

NOTE

A minimum of two loops of cable is required around spacer to remove slack.



c. Install three clamps (16), three screws (22), three washers (21), and three nuts (20) through three clips (23).

d. Connect four connectors P1, P2, P3, and P4 (14) to main rotor blade connectors J1 (15).

e. Lockwire connectors (14) to connectors (15). Use lockwire (E34).

GO TO NEXT PAGE

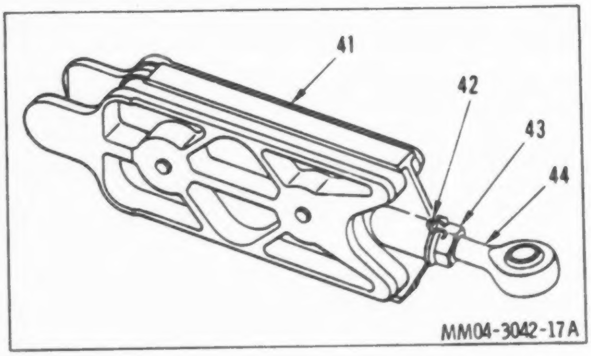
5-2-38. MAIN ROTOR BLADE PHASE ADJUSTMENT (cont) 5-2-38

B. ADJUSTMENT

NOTE

Fine blade phase adjustment is accomplished by adjusting only damper rod end one half turn.

1. **Adjust dampers (41) for leading blade as follows:**
   a. Disconnect leading edge damper and trailing edge damper rod ends from lead-lag link (para 5-2-19).
   b. Cut and remove lockwire (42). Loosen jam nut (43).
   c. Lengthen rod end (44) on leading edge damper (41) and shorten rod end (44) on trailing edge damper (41) equal amounts, as required to phase blade.
   d. Torque jam nut (43) on rod end. Lockwire (42) use lockwire (E15) (para 5-2-19).
   e. Connect damper rod ends to lead-lag link (para 5-2-19).



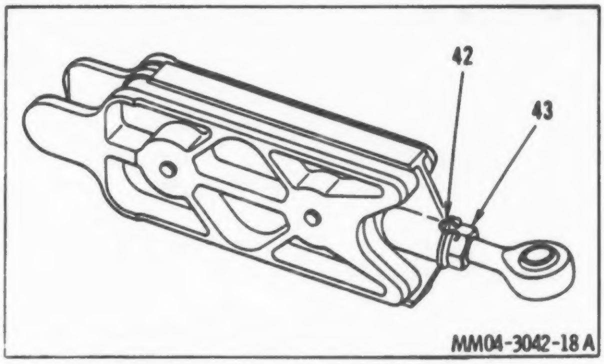
2. **Adjust dampers (41) for lagging blade.**
   a. Disconnect leading edge and trailing edge dampers from lead-lag link (para 5-2-19).
   b. Remove lockwire (42). Loosen jam nut (43).
   c. Shorten rod end (44) on leading edge damper (41) and lengthen rod end on trailing edge damper (41) equal amounts as required to phase blade.

GO TO NEXT PAGE

5-2-38. MAIN ROTOR BLADE PHASE ADJUSTMENT (cont) 5-2-38

d. Torque jam nut (43) on rod end and lockwire (42) use lockwire (E15) (para 5-2-19).

e. Connect damper rod ends to lead-lag link (para 5-2-19).

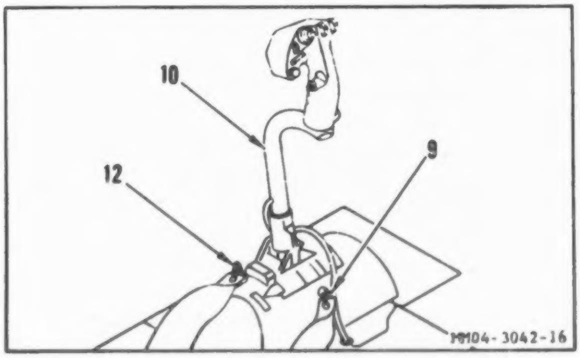


3. **Remove -5 rig pin (9) and -9 rig pin (12) from pilot cyclic stick (10).**

4. **Disconnect primary hydraulic external power (para 1-7-18).**

5. **Inspect (TI).**

6. **Perform main rotor track and balance operation check (TM 55-1520-238-T).**



END OF TASK

5-2-39. MAIN ROTOR BLADE BALANCE WEIGHT REMOVAL/INSTALLATION 5-2-39

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Materials/Parts:

Balance Weight	1615-01-181-9400
Balance Weight	1615-01-181-9401

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

NOTE

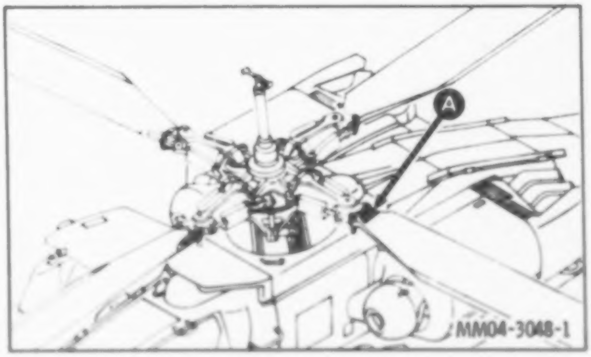
This task is typical for all four main rotor blades.

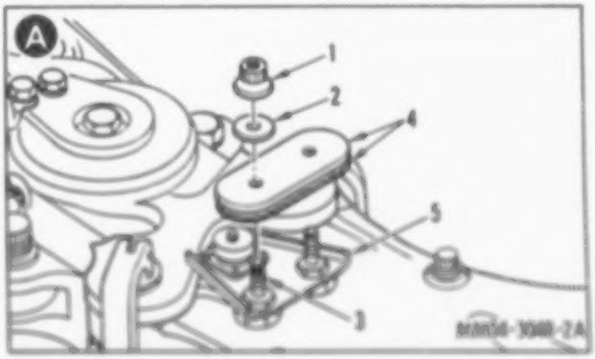
A. REMOVAL

NOTE

Weights are added or subtracted to balance main rotor. A maximum of nine may be installed.

1. **Remove two nuts (1) and two washers (2) from studs (3).**
2. **Remove weights (4) from bracket (5).**





B. CLEANING

Wipe bracket with clean dry rag.

C. INSPECTION

1. **Check bracket for cracks and studs for stripped threads.** None allowed.
2. **Check bracket and weights for corrosion (para 1-5-38).**

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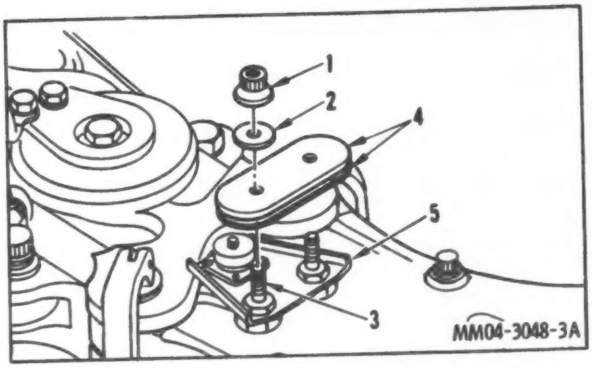
5-2-39. MAIN ROTOR BLADE BALANCE WEIGHT REMOVAL/INSTALLATION (cont) 5-2-39



D. INSTALLATION

1. **Install weights (4), two washers (2), and two nuts (1).** Torque nuts (1) to **100 INCH-POUNDS.**
   a. Install weights (4) on studs (3).
   b. Install two washers (2) and two nuts (1) on studs (3).
   c. Torque nuts (1) to **100 INCH-POUNDS.**
2. **Inspect** (TI).
3. **Perform main rotor track and balance** operational check (TM 55-1520-238-T).

END OF TASK

Section III. TAIL ROTOR MAINTENANCE

5-3-1. TAIL ROTOR ASSEMBLY INSPECTION 5-3-1

Tools:

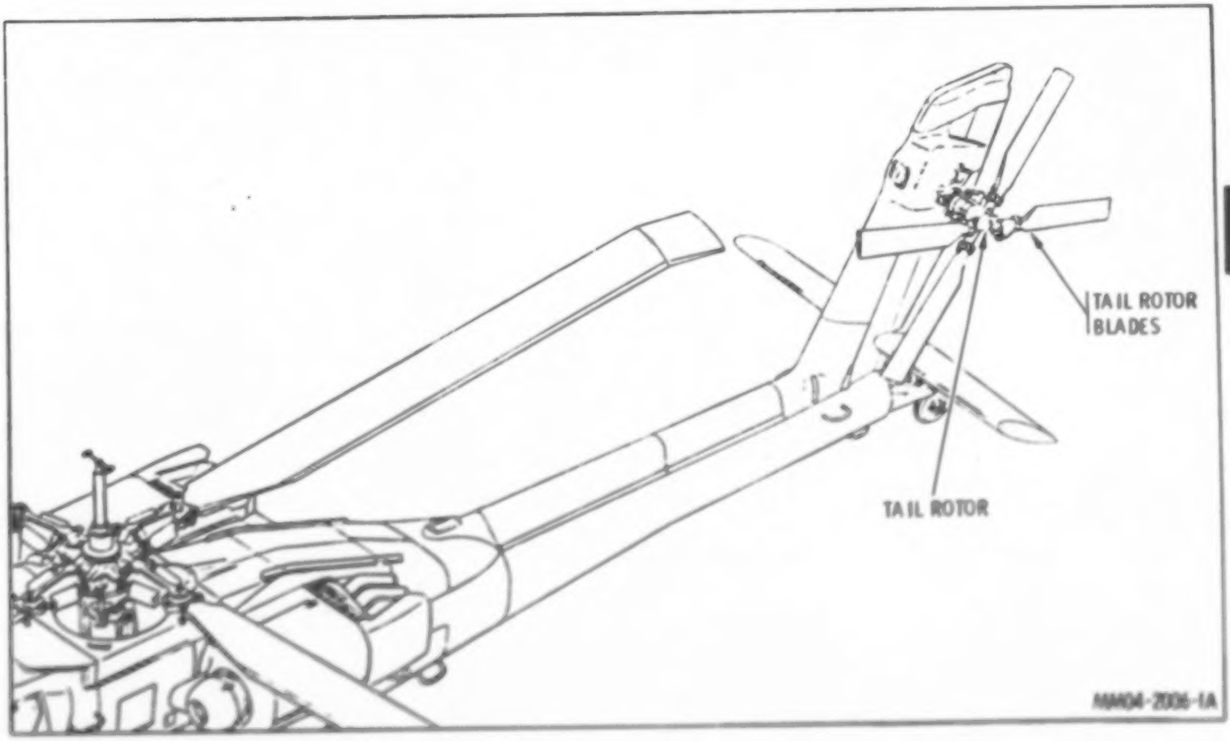
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Scale, Dial Indicating	6670-00-254-4634

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



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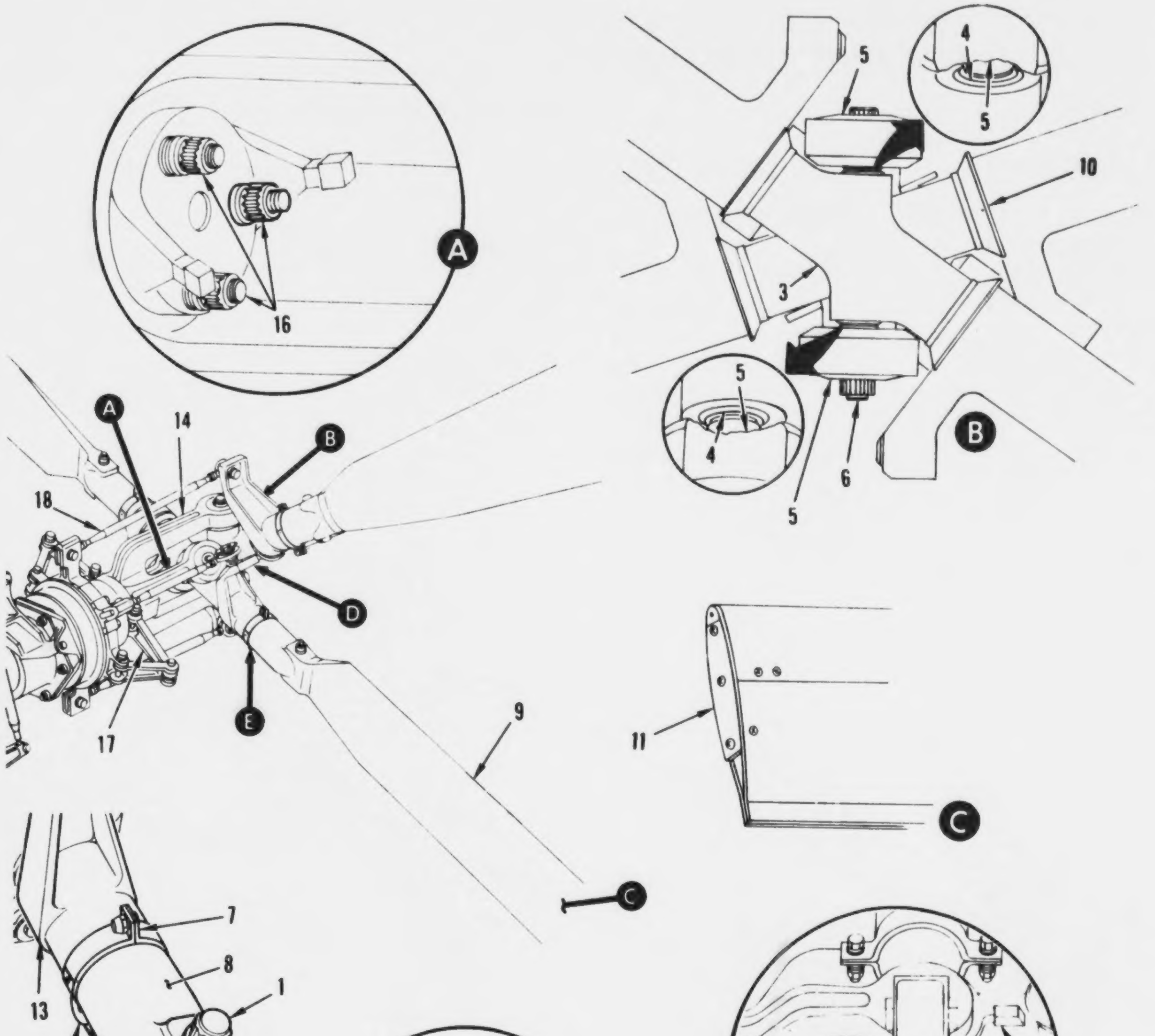
5-3-1. TAIL ROTOR ASSEMBLY INSPECTION (cont) 5-3-1


A
16
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4
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10
3
5
4
5
6
5
B
A
14
B
18
D
E
17
9
11
C
C
7
8
1
13
12
D
15
15
15
13
12
2
E

MM04-2006-2B

1. **Check tail rotor assembly for cracks, nicks, gouges, and scratches.**

2. **Check tail rotor assembly for loose or missing lockwire and cotter pins.**

NOTE

Corrosion will be treated in accordance with para 1-5-38.

3. **Check tail rotor for evidence of corrosion.**

CAUTION

If a preload indicating washer is loose, the washer must be removed and replaced with a new assembly.

4. **Check tail rotor blade attaching bolt (1) for loose preload indicating washer (2).**

5. **Check hub (3) for play between hub bushings (4) and resilient mounts (5).** None allowed.

6. **Check resilient mounts (5) for debonding.** None allowed.

7. **Check resilient mounts (5) for deterioration.**

8. **Check brackets (7) on rotor blade root fitting (8) for security of attachment.**

9. **Check rotor blade (9) for bonding separation** (para 5-3-3).

10. **Check rotor blade dust shield (10)for splits, tears, or deterioration.** None allowed.

11. **Check rotor blade tip cap (11) for loose or missing screws.**

12. **Check electrical conduit (12) and receptacle (13) for loose attachment.**

13. **Check fork (14) for distortion or twists.** None allowed.

14. **Check bumpers (15) for loose attachment, wear, splits, or deterioration.** None allowed.

15. **Check tail rotor attaching nuts (16) for looseness and corrosion** (para 1-5-38).

16. **Check drive links (17) for loose attachment.**

17. **Check pitch control links (18) for loose attachment.**

18. **Check pitch horn bushing for galling and elongation.** Elongation of inner diameter of bushings not to exceed **0.004 INCH.**

19. **Inspection prior to removal of tail rotor swashplate for noisy or rachety condition.**

NOTE

This inspection will be performed on all four tail rotor blade assemblies.

   a. Inspection of tail rotor blade bearings for pitch change force.

      (1) Remove pitch control link from blade pitch horn (para 5-3-3).

GO TO NEXT PAGE

(2) Attach spring scale to blade pitch horn. Pulling perpendicular to pitch arm, measure force required to rotate blade on hub.

(3) If force required is less than 25 pounds, install pitch control link on blade pitch horn (para 5-3-4) and accomplish steps a. (1) and (2) for remaining blades.

(4) If force required is 25 pounds or more, repair or replace using the following procedures:

(a) Remove tail rotor blade assembly (para 5-3-3).

(b) Using scotchbrite (E112), clean contaminants (lightly abrade) from inside diameter of outer bearing sleeve, inner bearing sleeve, and spindle bearing surfaces.

(c) Wipe bearing surfaces with clean, dry, lint-free cloth (E32) to remove any scotchbrite residue.

(d) Reinstall tail rotor blade assembly (para 5-3-4) and reaccomplish pitch change force test (step a.).

(e) If force required is less than 25 pounds, complete installation of tail rotor blade assemblies (para 5-3-4).

(f) If force required is still 25 pounds or more, replace tail rotor blade assembly.

b. Swashplate assembly, slider force pull test and inspection.

Accomplish the following:

NOTE

- Special inspection for replacement of the tail rotor swashplate assembly shall be accomplished during a tail rotor swashplate installation.
- To perform the tail rotor swashplate slider force pull test, it is necessary to fabricate a two leg (equal length) sling for attachment of the force scale and swashplate assembly. Legs should be approximately 12 inches long and made from suitable strength safety wire or fine stranded aircraft cable.

(1) Disconnect nonrotating swashplate from bellcrank (para 11-5-2).

(2) Attach spring scale to swashplate and measure force required to move swashplate assembly axially on static mast.

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(a) If force required to move swashplate is less than 25 pounds, accomplish the the swashplate assembly clearance inspection.

(b) If force required to move swashplate is 25 pounds or more, perform the following:

1. Remove swashplate assembly (para 11-5-2).
2. Using scotchbrite (E145), lightly abrade slider bearings.
3. Reinstall swashplate assembly (para 11-5-2).
4. Perform slider force test (step b).
5. If force required is still 25 pounds or more, replace swashplate assembly (para 11-5-2).

(3) Swashplate assembly clearance inspection.

(a) Check static mast to swashplate clearance by inserting a feeler gage between the static mast and swashplate bearing. Do not attempt to move the swashplate while taking this measurement. If clearance is more than 0.011 inch, replace swashplate assembly.

(b) Clearance below 0.011 inch may allow some swashplate movement; this movement is acceptable.

(4) Swashplate assembly movement inspection.

Check swashplate assembly by moving it with an up and down motion. If any internal or unusual contact sounds are heard, replace swashplate assembly.

(5) If these inspections are acceptable, reattach the nonrotating swashplate to the bellcrank (para 11-5-2) and reattach the pitch control links to the pitch horn (para 5-3-4).

END OF TASK

5-3-2. TAIL ROTOR BLADE REPAIR CRITERIA 5-3-2

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

1. **The tail rotor blade repair criteria provide inspection and repair information for the rotor blades.** The instructions for inspection are presented in tabular form.

Table 5-5. Provides repair limits for scratches, nicks, and gouges.

Table 5-6. Provides repair limits for dents and depressions.

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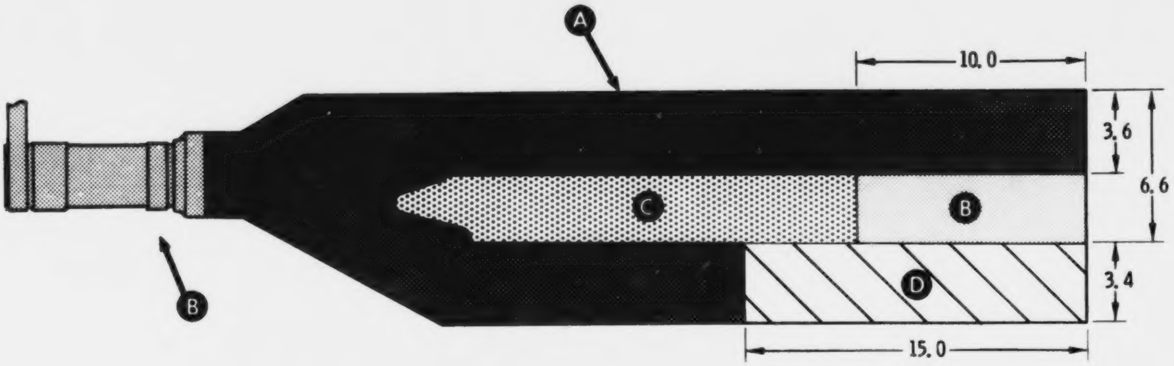

TABLE 5-5 REPAIR LIMITS FOR SCRATCHES, NICKS, GOUGES AND CORROSION
SHEET 1 OF 2

AREA	MAXIMUM DEPTH WITHOUT REPAIR	MAXIMUM DEPTH WITH REPAIR	REPAIR PARAGRAPHS
Ⓐ ■	NONE	0.005	5-3-5
Ⓑ □	0.002	0.015	5-3-5
Ⓒ ▒	NONE	0.010	5-3-5
Ⓓ ▨	0.002	0.005	5-3-5

NOTES:
1. ALL DIMENSIONS ARE IN INCHES.
2. LIMITS APPLY TO BOTH INBOARD AND OUTBOARD SURFACES.
3. INSPECTION WITH MAGNIFIER REQUIRED.
4. NO CRACKS OR HOLES ALLOWED.
5. CORROSION MUST BE TREATED PER PARA 1-5-38.

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5-3-2. TAIL ROTOR BLADE REPAIR CRITERIA (cont) 5-3-2

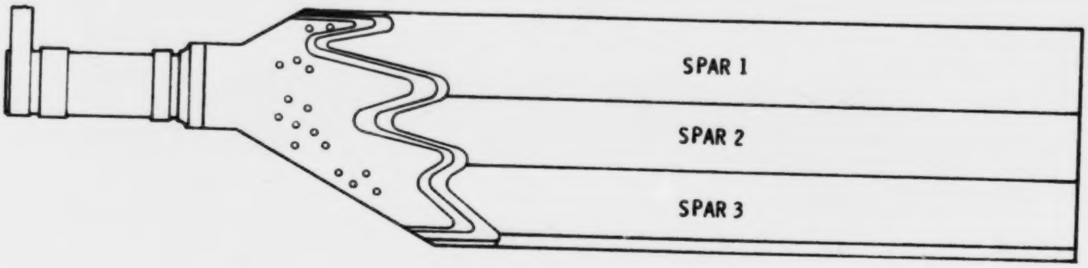

TABLE 5-5. REPAIR LIMITS FOR DEBONDING.
SHEET 2 OF 2

NO DEBONDS, DELAMINATIONS, VOIDS ETC ACCEPTABLE, EXCEPT AS FOLLOWS:

1. DOUBLER TIPS-1/2" LONG MAXIMUM.
2. SPAR 1 TO SPAR 2 OR SPAR2 TO SPAR 3 WITHIN 1" OF TIP. THIS VOID SHALL BE SEALED WITH EA9309 (E67).
3. TRAILING EDGE VOIDS AT TIP. TRIM TIP UP TO 3/8" RADIUS TO REMOVE.

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5-3-2. TAIL ROTOR BLADE REPAIR CRITERIA (cont) 5-3-2

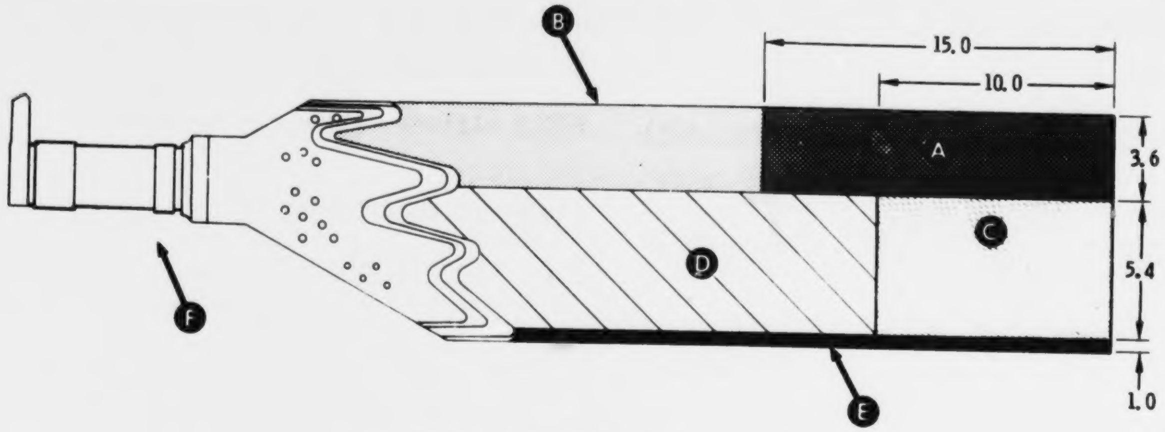

TABLE 5-6 REPAIR LIMITS FOR DENTS AND DEPRESSIONS

AREA	MAXIMUM DEPTH WITHOUT REPAIR	MAXIMUM DEPTH WITH REPAIR	MAXIMUM ALLOWED AREA	MAXIMUM NUMBER OF DEFECTS	MINIMUM DISTANCE BETWEEN DEFECT CENTERS	REPAIR PARAGRAPHS
Ⓐ ■	[2]	0.010	1.0 x 1.50	3	2.50	5-3-6
Ⓑ ░	[2]	0.005	1.0 x 1.50	3	2.50	5-3-6
Ⓒ ▒	0.025	.025	1.0 x 1.50	3	2.50	5-3-6
Ⓓ ▨	0.010	0.010	1.0 x 1.50	3	2.50	5-3-6
Ⓔ ■	0.020	N/A	1.0 x 1.0	3	4.0	N/A
Ⓕ □	NONE	NONE	N/A	N/A	N/A	N/A

NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
[2] USE STRAIGHTEDGE AND DEPTH GAGE. NO VISIBLE DENT SHALL EXIST DURING STRAIGHTEDGE TEST. STRAIGHTEDGE SHALL ROCK SMOOTHLY WITHOUT JARRING OR CLICKING ON ALL CURVED SURFACES.
3. INSPECT FOR BOND DELAMINATION IN AREA OF DENT, AND DE-ICING BLANKET ELECTRICAL CONTINUITY.
4. NO SHARP CREASES ALLOWED.

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MM04-2119-2D

5-3-3. TAIL ROTOR BLADE REMOVAL

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

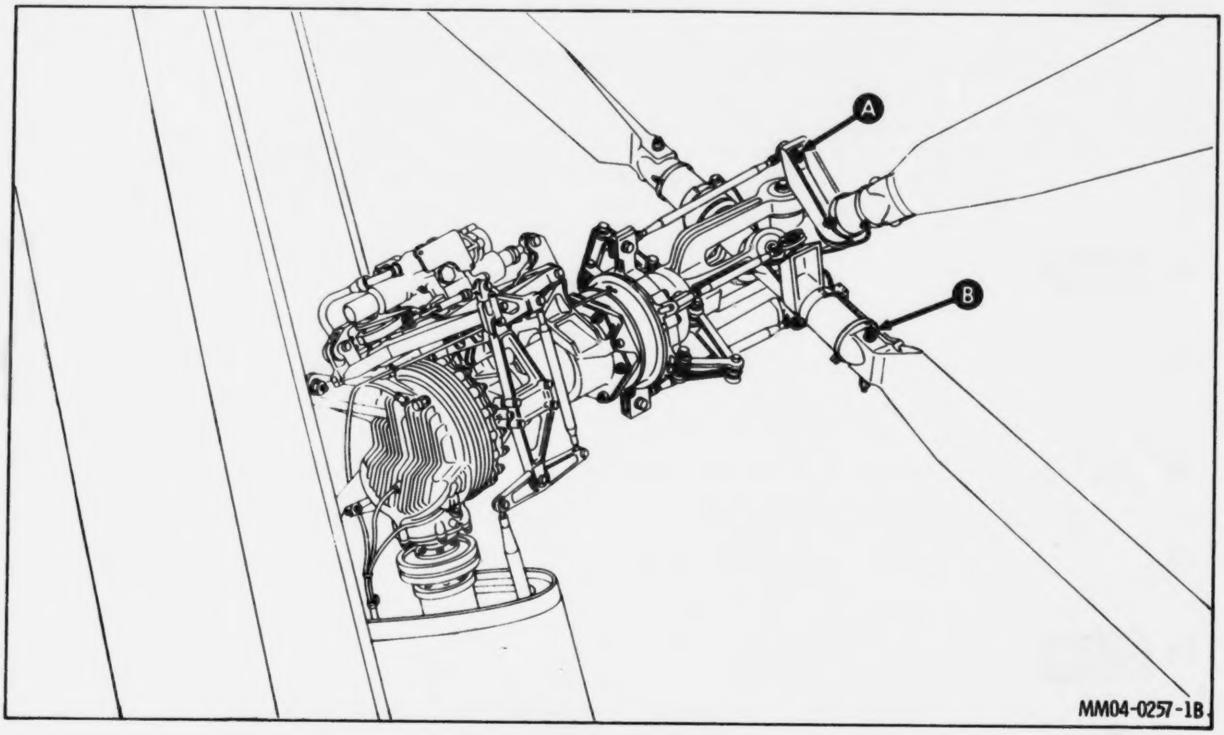
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Stand, Maintenance	1730-00-269-8283

Personnel Required:

67R10 Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



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5-3-3. TAIL ROTOR BLADE REMOVAL (cont) 5-3-3

A. REMOVAL

CAUTION

Do not turn pitch horn more than 30 degrees in any direction while pitch control links are disconnected; damage to straps may be caused.

NOTE

This task is typical for all four rotor blades. Identify each blade for reinstallation at same location.

1. **Inspect tail rotor blades** (para 5-3-1).

2. **Remove pitch control link (1) from rotor blade pitch horn (2).**

   a. Remove and discard cotter pin (3).

   b. Hold bolt (4). Remove nut (5).

   c. Remove bolt (4), safety washer (6), and washer (7).

   d. Secure link (1) to prevent damage to parts.

3. **Detach four de-ice connectors P999, P1034, P1035, and P1036 (8) from four blade connectors J999, J1034, J1035, and J1036 (9).**

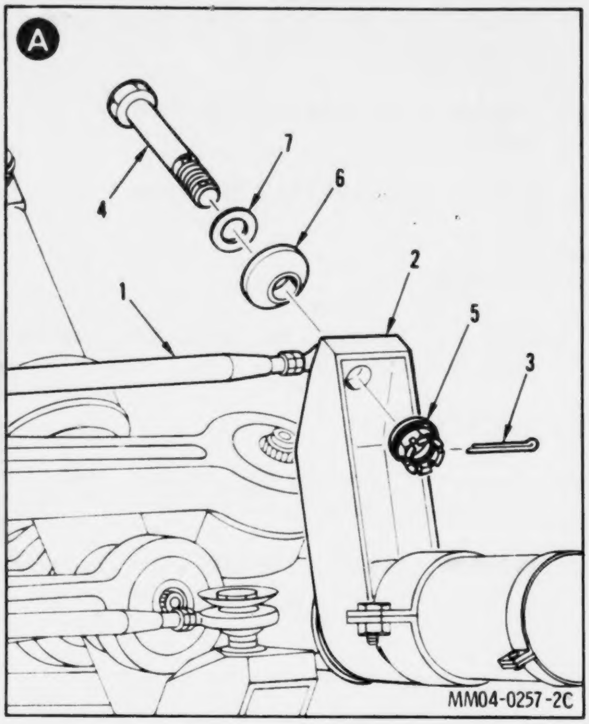
   a. Cut and remove lockwire.

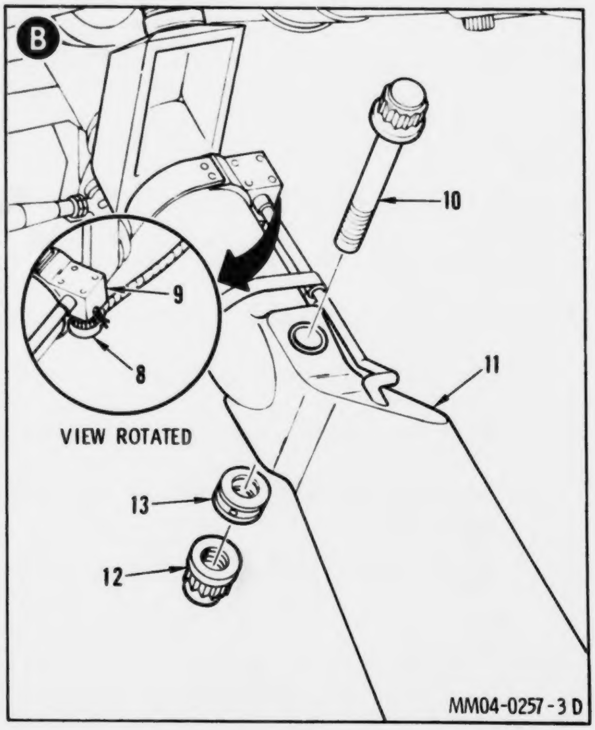
   b. Detach de-ice connectors (8) from blade connectors (9).

4. **Remove bolt (10) from rotor blade (11).**

   a. Hold bolt (10). Remove and discard nut (12) and preload indicating washer (13).

   b. Remove bolt (10) from rotor blade (11).





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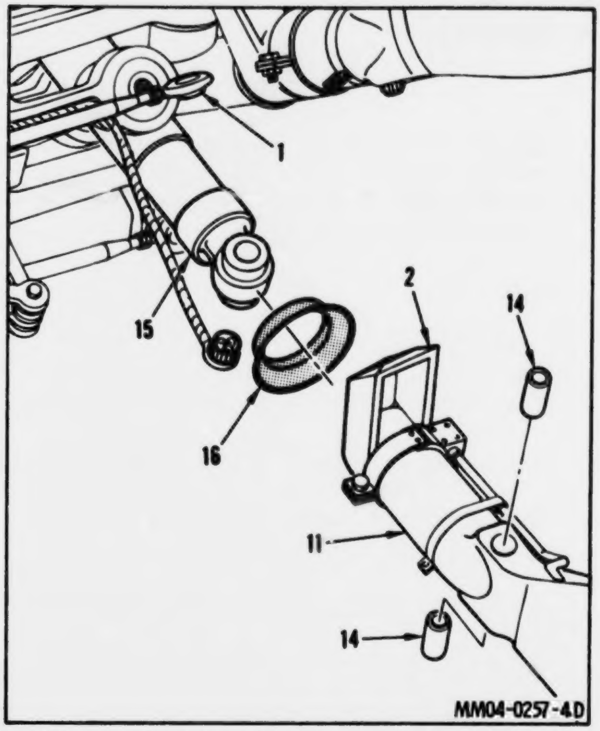
5-3-3. TAIL ROTOR BLADE REMOVAL (cont) 5-3-3



5. Remove two bushings (14) from rotor blade (11).

6. Remove rotor blade (11) from hub (15).

7. Remove dirt shield (16) from hub (15).

B. CLEANING

Wipe all removed and attaching parts with a clean rag.

C. INSPECTION

1. Check hub, for gouges, nicks, and scratches (para 5-3-11).

2. Check hub, pitch control link, pitch horn, and rotor blade for corrosion (para 1-5-38).

3. Check rotor blade (para 5-3-2).

4. Check entire rotor blade for bonding separation. A white line along the aft edge of spar 1 (3.6 inches aft of leading edge) or spar 2 (6.5 inches aft of leading edge) may be a symptom of debond. These areas and any other suspect areas should be tapped out with the edge of a coin for debonding verification. Comparison of a good area and a suspect area should be made. A good bond makes a nice sharp sound, while a debond will have a dull thud or even a rattling sound.

5. Check strap pack for corrosion (para 5-3-11).

6. Check pitch link (para 11-5-1).

7. Check blade attachment holes and bushings for wear.

   a. Blade attach bolt 0.5600 minimum diameter.

   b. Bushing inside diameter 0.5635 maximum diameter.

   c. Bushing outside diamter 0.9340 minimum diameter. Bushing liner not to wear thru.

   d. Blade root fitting 0.9385 maximum diameter.

END OF TASK

5-3-4. TAIL ROTOR BLADE INSTALLATION 5-3-4

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 3/8-inch Drive	5120-00-821-3441
Handle, Socket Wrench	5120-00-236-7590
Stand, Maintenance	1730-00-269-8283

Materials/Parts:

Washer, Preload Indicating (4)
Cotter Pin (4)
(E34) Lockwire

Personnel Required:

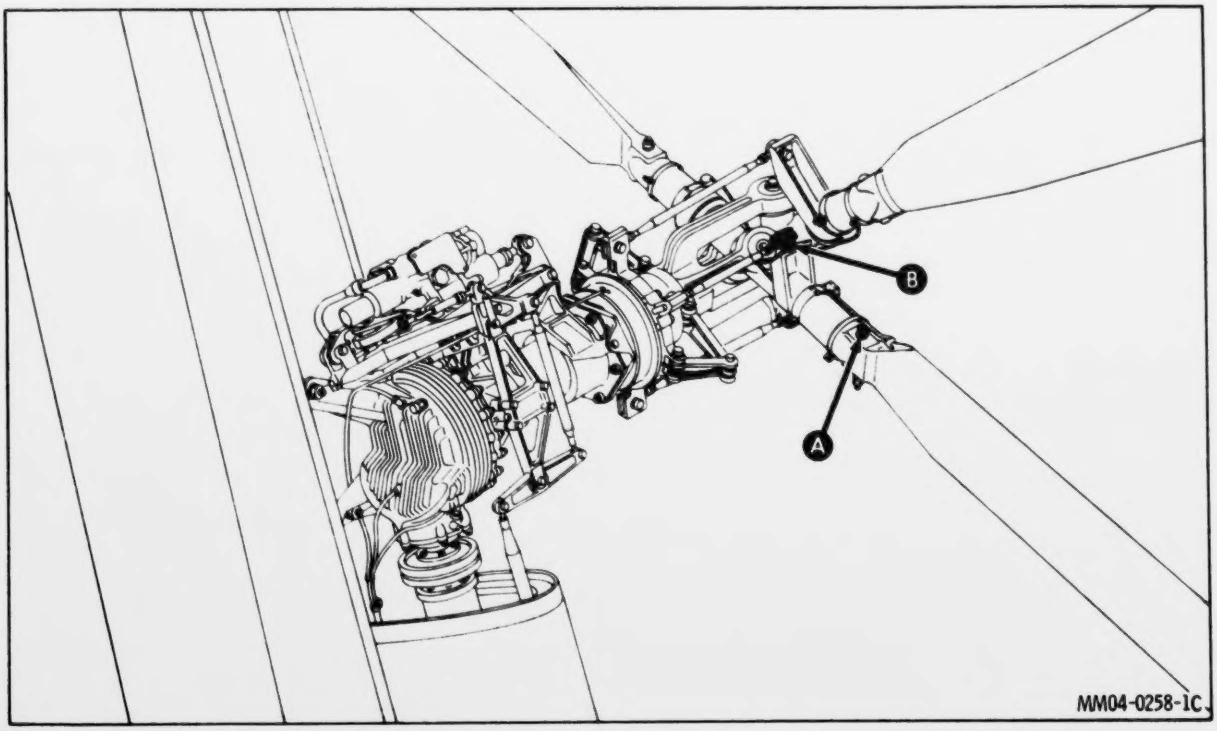
67R10 Attack Helicopter Repairer (2)
One to assist
66R30 Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



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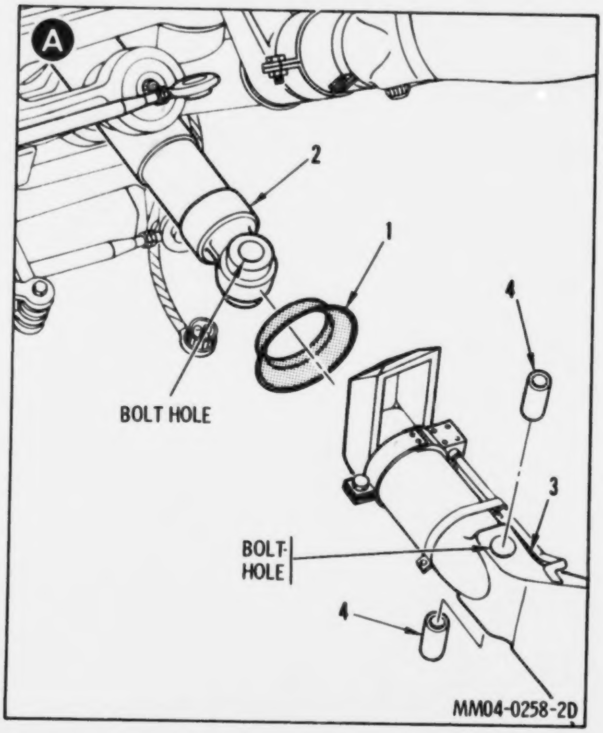
5-3-4. TAIL ROTOR BLADE INSTALLATION (cont)

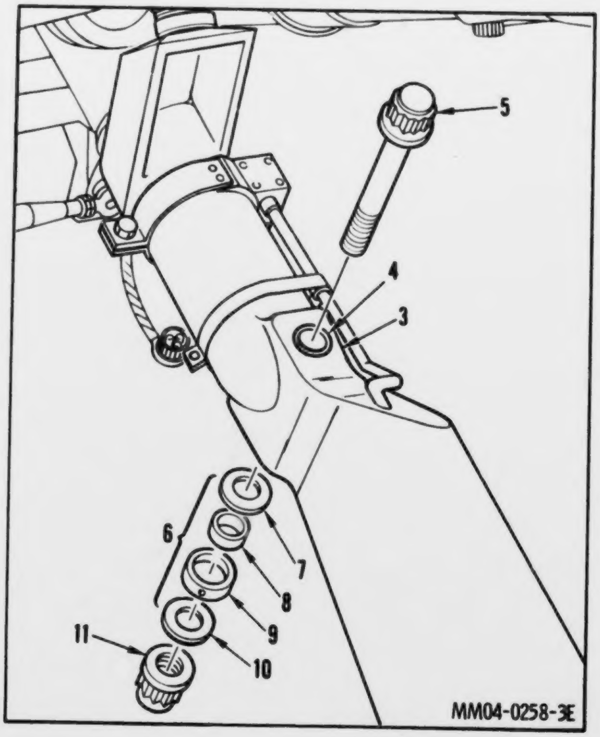
NOTE

This task is typical for all four rotor blades. If reinstalling old blades, ensure that previously identified tail rotor blades are installed in the same location.

1. **Install dirt shield (1) on hub (2) with flared end of shield facing rotor blade (3).**
2. **Install blade (3) on hub (2).**
   a. Install blade (3) on hub (2) with bolt holes in blade and hub alined.
   b. Install two bushings (4) in bolt holes of rotor blade (3).



3. **Install bolt (5) through two bushings (4) and blade (3).**
4. **Install new preload indicating washer (6), in proper sequence, on bolt (5).**
   a. Install washer (7), inner washer (8), outer washer (9) and washer (10).
   b. Install new nut (11). Run nut (11) on bolt (5) until contact is made with washer assembly (6).



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5-3-4. TAIL ROTOR BLADE INSTALLATION (cont) 5-3-4

5. **Torque nut (11) using preload indicating washer torquing method.**

   a. Hold bolt (5).

   b. Insert scriber into hole in outer washer (9).

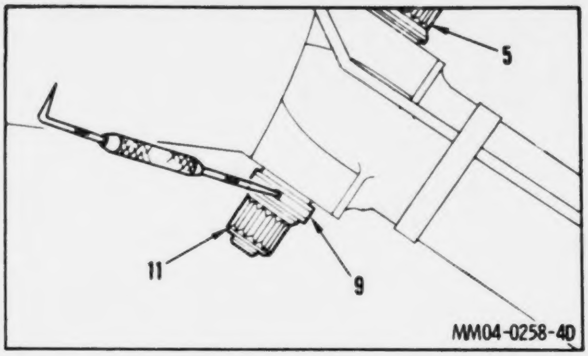
   CAUTION

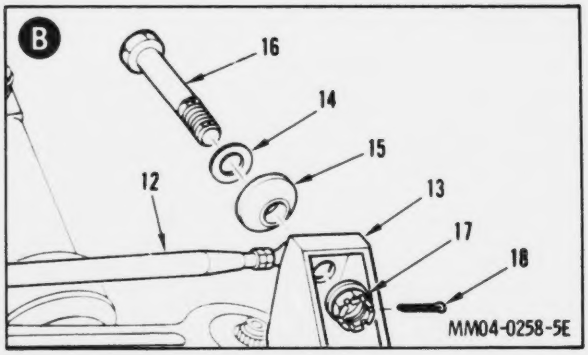
   Do not continue to tighten nut after preload indicating washer no longer turns. You will damage preload indicating washer, bolt, and nut. Preload indicating washer, bolt, and nut must be replaced if over-torque occurs.

   c. Tighten nut (11) **1/8 TURN** at a time while turning outer washer (9). Use socket wrench handle.

   NOTE

   Torque is correct when outer washer no longer turns.





6. **Inspect (TI).**

7. **Install pitch control link (12) on pitch horn (13).**

   a. Install washer (14) and safety washer (15) on bolt (16).

   b. Install bolt (16) through pitch control link (12) and pitch horn (13).

   c. Check self-retaining bolt fit (para 11-2-1).

   d. Install nut (17).

8. **Torque nut (17) to 225 to 285 INCH-POUNDS.**

   a. Holding bolt (16), torque nut (17) to **225 INCH-POUNDS.**

   b. Increase torque to aline cotter pin hole. Do not exceed **285 INCH-POUNDS.**

   c. Install new cotter pin (18).

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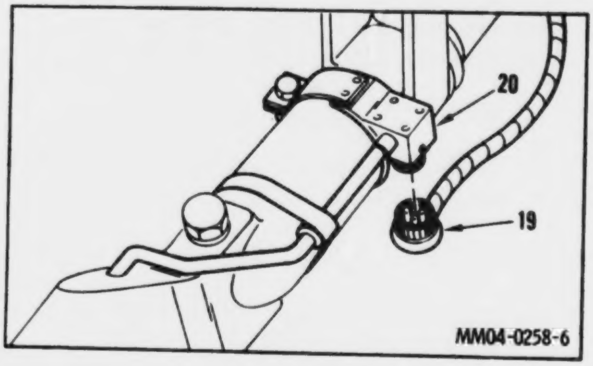
5-3-4. TAIL ROTOR BLADE INSTALLATION (cont) 5-3-4



9. **Attach four de-ice connectors P999, P1034, P1035, and P1036 (19) to four blade connectors J999, J1034, J1035, and J1036 (20).** Lockwire connectors (19) and (20). Use lockwire (E34).

10. **Inspect (TI).**

11. **Perform tail rotor deice system controller adjustment** (para 12-2-14).

12. **Perform tail rotor balance** operational check (TM 55-1520-238-T).

END OF TASK

5-3-5. TAIL ROTOR BLADE SCRATCH, NICK, AND GOUGE REPAIR 5-3-5

This task covers: A. ABRASION STRIP REPAIR B. BLADE REPAIR

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Airframe Repairer's	5180-00-323-4876
Gun, Spray	4940-00-261-8413
Cup, Gun, Spray	4940-00-190-5164
Respirator, Air Filtering	4240-00-022-2524

Materials/Parts:

(E20)	Abrasive Paper
(E21)	Abrasive Paper
(E73)	Abrasive Paper
(E74)	Abrasive Cloth
(E75)	Abrasive Cloth
(E76)	Abrasive Cloth

Personnel Required:

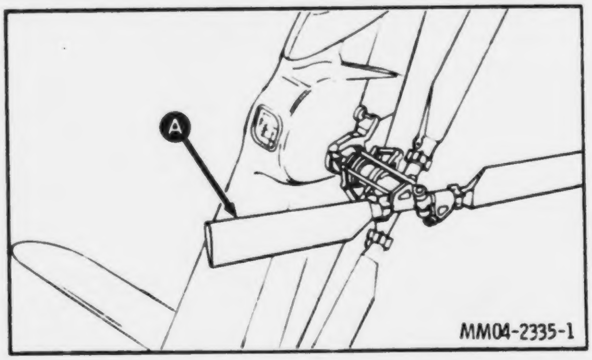
68G10	Aircraft Structural Repairer
66R30	Inspector/Supervisor

References:

TM 55-1500-345-23

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



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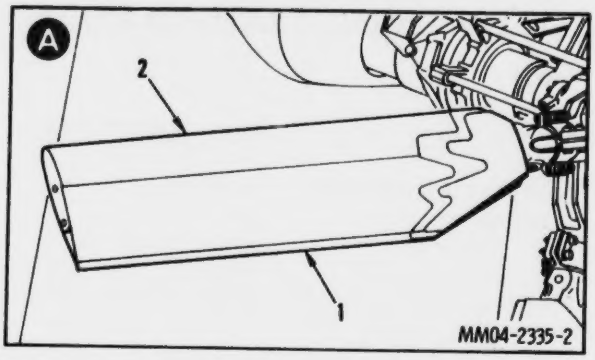
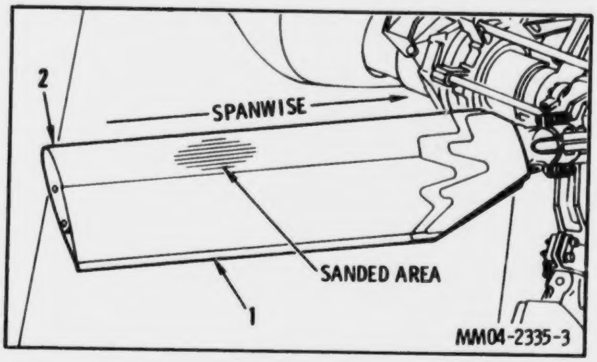
5-3-5. TAIL ROTOR BLADE SCRATCH, NICK, AND GOUGE REPAIR (cont) 5-3-5

A. ABRASION STRIP REPAIR

1. **Remove scratch, scratches, gouges, and nicks from tail rotor blade (1) leading edge (2) abrasion strip.**
   - a. Remove defect from tail rotor blade (1) leading edge (2) abrasion strip by sanding spanwise. Use abrasive paper (E20).
   - b. Smooth sanded repair area on tail rotor blade (1) leading edge (2) abrasion strip by sanding spanwise. Use abrasive paper (E21).
   - c. Finish tail rotor blade (1) leading edge (2) abrasion strip surface by sanding spanwise. Use abrasive paper (E73).





B. BLADE REPAIR

1. **Remove scratch, scratches, nicks, and gouges from tail rotor blade (1) surfaces.**
   - a. Remove defects from tail rotor blade (1) surfaces by sanding spanwise. Use abrasive cloth (E74).
   - b. Smooth sanded repair area on tail rotor blade (1) by sanding spanwise. Use abrasive cloth (E75).
   - c. Finish tail rotor blade (1) surface by sanding spanwise. Use abrasive cloth (E76).

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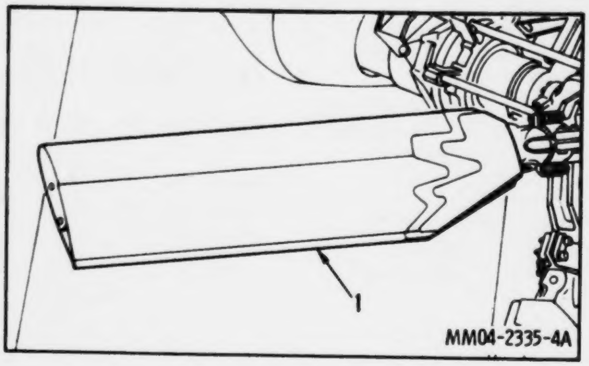
5-3-5. TAIL ROTOR BLADE SCRATCH, NICK, AND GOUGE REPAIR (cont) 5-3-5

2. Wipe tail rotor blade (1) clean. Use rags.

3. Inspect (TI).

4. Spot prime and paint tail rotor blade (1) repair and surrounding area (TM 55-1500-345-23). Use spray gun, cup, and respirator.



END OF TASK

5-3-6. TAIL ROTOR BLADE DENT AND DEPRESSION REPAIR 5-3-6

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Airframe Repairer's	5180-00-323-4876
Gun, Spray	4940-00-261-8413
Cup, Gun, Spray	4940-00-190-5164
Respirator, Air Filtering	4240-00-022-2524

Materials/Parts:

(E20)	Abrasive Paper
(E21)	Abrasive Paper
(E69)	Abrasive Paper

Personnel Required:

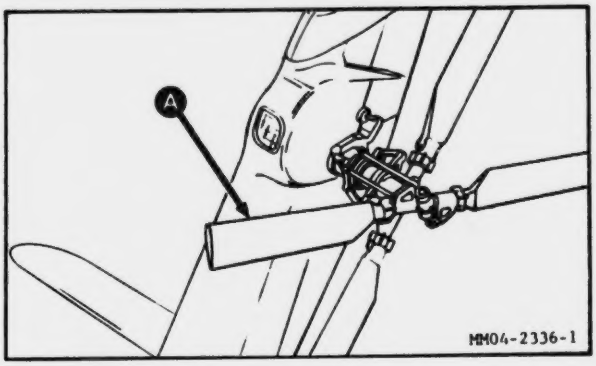
68G10	Aircraft Structural Repair
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T
TM 55-1500-345-23

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



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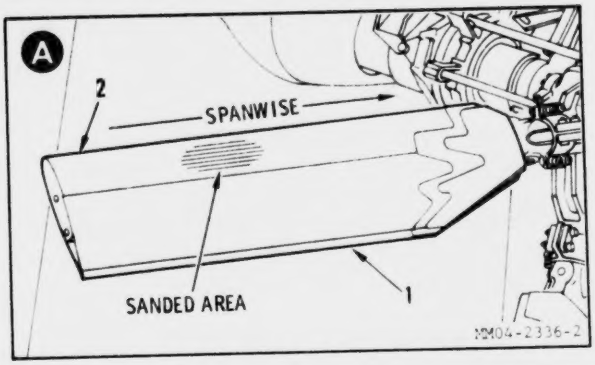
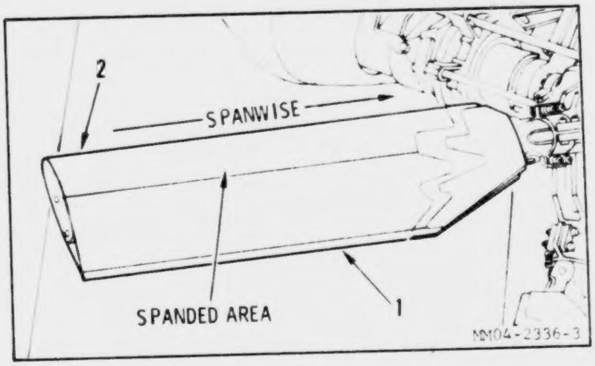
5-3-6. TAIL ROTOR BLADE DENT AND DEPRESSION REPAIR (cont)

1. **Remove paint from rotor blade (1) dents, depressions, creases, and surrounding area by sanding in a spanwise direction.** Use abrasive paper (E20).

2. **Finish rotor blade (1) surface by sanding in a spanwise direction.** Use abrasive paper (E21).





WARNING

Trichloroethane is highly toxic. Use in well ventilated area. Breathing vapors could cause dizziness. If trichloroethane comes in contact with eyes or skin, flush with water. If trichloroethane comes in contact with eyes or dizziness occurs, seek medical aid.

3. **Wipe rotor blade (1) surface clean.** Use trichloroethane (E39). Wear goggles, gloves, and apron.

WARNING

Epoxy compound is toxic. Use in well ventilated area. If compound comes in contact with eyes or skin, flush with water. If irritation occurs, seek medical aid.

4. **Brush an even coat of compound (E60) on rotor blade (1) dents, depressions, creases, and surrounding area.** Use brush (E68). Allow compound (E60) to dry at ambient temperature for 30 minutes. Discard brush in suitable container.

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5. **Spread mixed compound (E60) over rotor blade (1) repair.** Blend compound (E60) to surrounding skin surface. Use putty knife. Allow compound (E60) to dry at ambient temperature for 24 hours.

6. **Sand dried compound (E60) on rotor blade (1) in a spanwise direction.** Use abrasive paper (E20).

7. **Finish sanding dried compound (E60) on rotor blade (1) in a spanwise direction.** Use abrasive paper (E21).

WARNING

Trichloroethane is highly toxic. Use in well ventilated area. Breathing vapors could cause dizziness. If trichloroethane comes in contact with eyes or skin, flush with water. If trichloroethane comes in contact with eyes or dizziness occurs, seek medical aid.

8. **Wipe rotor blade (1) clean.** Use trichloroethane (E39). Wear goggles, gloves, and apron.

9. **Spot prime and paint rotor blade (1) repair and surrounding area** (TM 55-1500-204-25/1).

10. **Inspect (TI).**

11. **Perform main rotor track and balance operational check** (TM 55-1520-238-T).

END OF TASK

5-3-7. TAIL ROTOR TEETER STOP BUMPER REPLACEMENT 5-3-7

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5120-00-323-4692
Apron, Impermeable	8415-00-082-6108
Gloves, Rubber	8415-00-266-8677
Goggles	4240-00-203-0317

Materials/Parts:

(E20)	Abrasive Paper
(E21)	Abrasive Paper
(E23)	Adhesive
(E39)	Trichloroethane

Personnel Required:

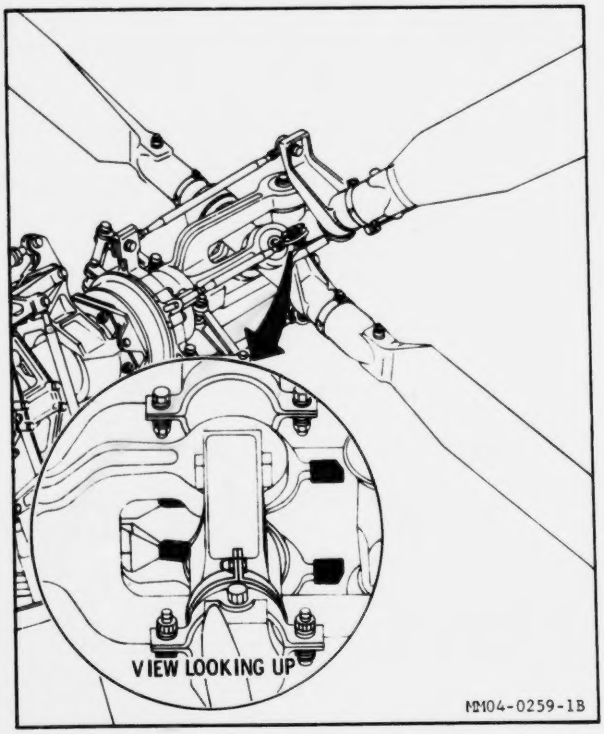
67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

NOTE

This task is typical for all four teeter stop bumpers.



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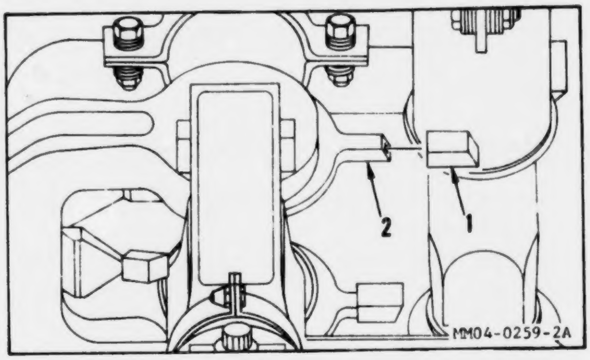
5-3-7. TAIL ROTOR TEETER STOP BUMPER REPLACEMENT (cont) 5-3-7



A. REMOVAL

Remove bumper (1) from teeter stop (2).

B. CLEANING

WARNING

Trichloroethane is highly toxic. Use in well ventilated area. Breathing vapors could cause dizziness. If trichloroethane comes in contact with eyes or skin, flush with water. If trichloroethane comes in contact with eyes or dizziness occurs, seek medical aid.

Remove old adhesive from teeter stop.

a. Remove as much of old adhesive as possible from teeter stop without removing any metal from teeter stop (2). Use abrasive paper (E20) followed by abrasive paper (E21).

b. Wipe teeter stop (2) clean. Use trichloroethane (E39). Wear goggles, gloves, and apron.

C. INSPECTION

1. **Check teeter stop for nicks and scratches.** Maximum depth not to exceed 0.020 inch.

2. **Check teeter stop for corrosion.** Maximum depth 0.010 (para 1-5-36).

GO TO NEXT PAGE

D. INSTALLATION

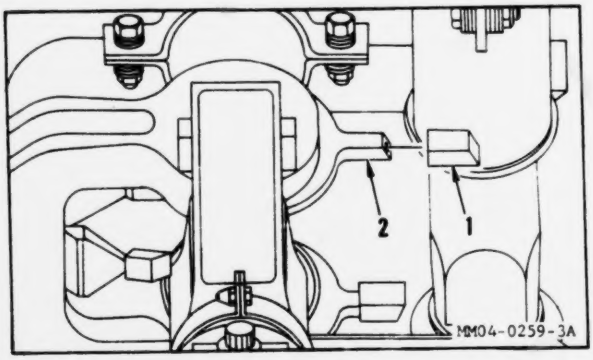
WARNING

Trichloroethane is highly toxic. Use in well ventilated area. Breathing vapors could cause dizziness. If trichloroethane comes in contact with eyes or skin, flush with water. If trichloroethane comes in contact with eyes or dizziness occurs, seek medical aid.

CAUTION

Temperature must be 69 °F (20 °C) or higher in area where adhesive is mixed and applied to ensure bonding of bumper to teeter stop. Mixed adhesive must be used within 40 minutes from time of mixing.

1. **Apply adhesive (E23) to bumper (1) and teeter stop (2).**
   a. Wipe teeter stop (2) clean. Use trichloroethane (E39) wear goggles, gloves and apron.
   b. Apply a thin coat of mixed adhesive (E23) to teeter stop (2) and inner surface of bumper (1).



2. **Install bumper (1) on teeter stop (2).**
3. **Allow adhesive to cure for 24 hours at ambient temperature.**
4. **Inspect (TI).**

END OF TASK

5-3-8. TAIL ROTOR HEAD REMOVAL 5-3-8

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

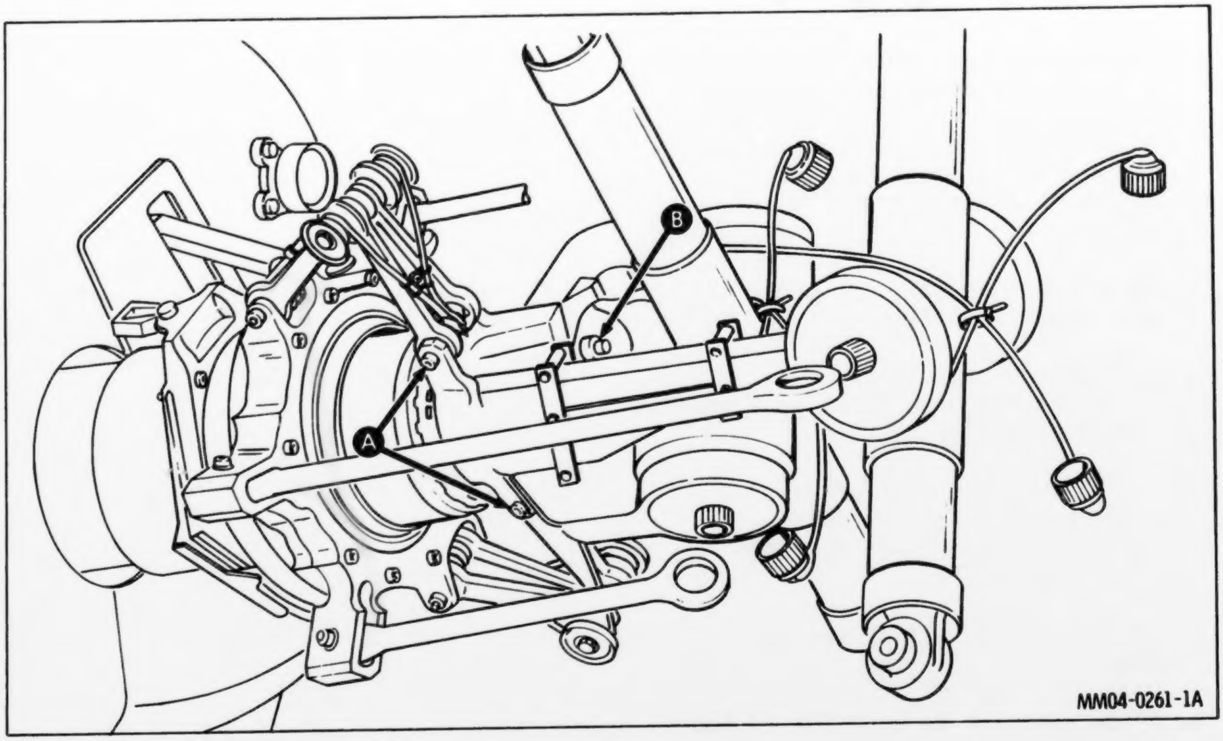
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Trailer, Maintenance	1730-00-435-7818
Stand, Maintenance	1730-00-269-8283
Tool Kit, Special	4920-01-180-7613
Adapter Kit, Airframe	1730-01-240-6743

Personnel Required:

67R10 Attack Helicopter Repairer (2)
One to assist

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
5-3-3	Tail rotor blade removed



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5-3-8. TAIL ROTOR HEAD REMOVAL (cont) 5-3-8

A. REMOVAL

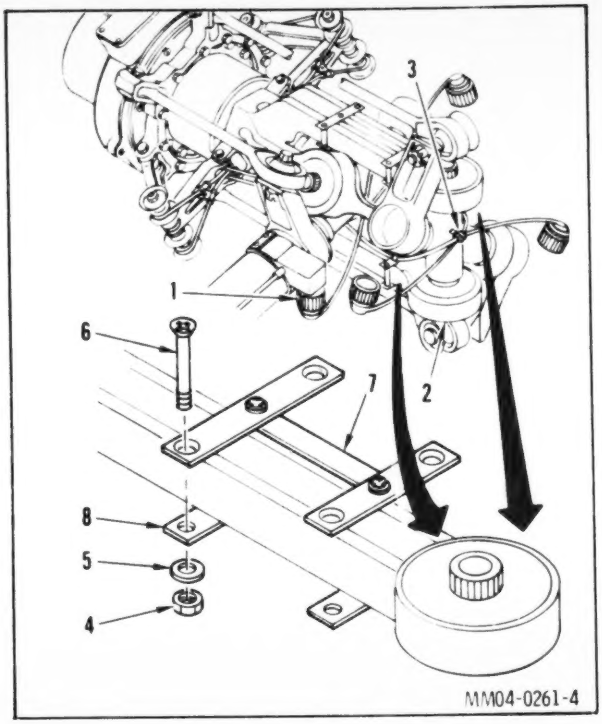
1. **Remove de-ice harness (1) from tail rotor head (2) two places.**

   a. Remove tiedown strap (3) two places.

   b. Remove eight nuts (4), washers (5), and screws (6).

   c. Remove two brackets (7).

   d. Remove two brackets (8).



2. **Remove two drive links (9) from tail rotor head (2).**

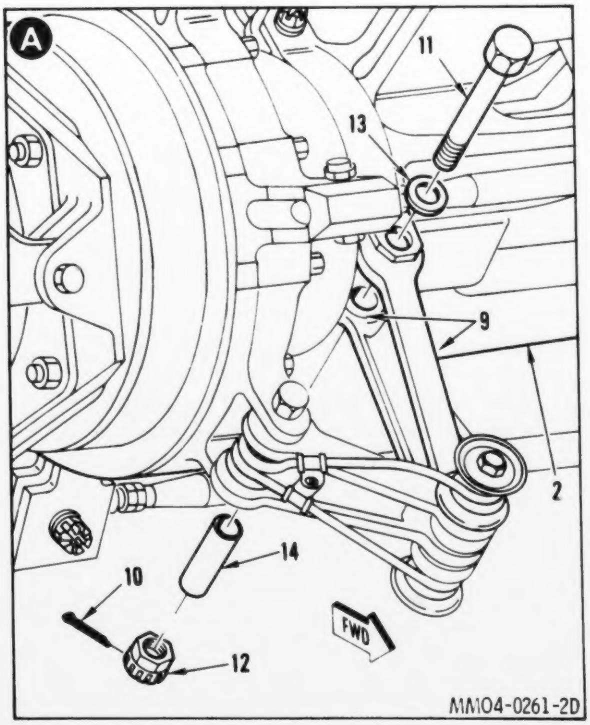
   a. Remove and discard two cotter pins (10).

   b. Hold two bolts (11). Remove two nuts (12).

   c. Remove two bolts (11) and washers (13).

   d. Remove two bushings (14).

   e. Remove two links (9) from rotor head (2).



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WARNING

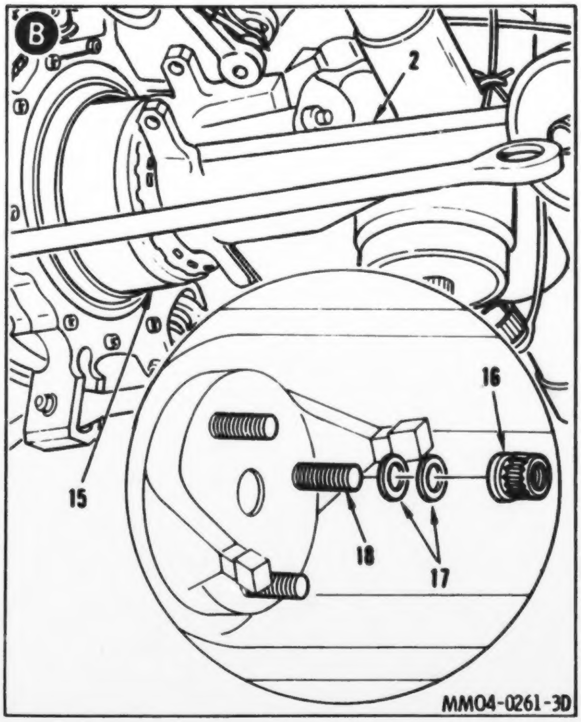
Tail rotor head weighs approximately 40 pounds. Two persons are needed for handling. If injury occurs, seek medical aid.

3. Remove tail rotor head (2) from tail rotor gearbox output shaft (15).

a. Remove three nuts (16) and six washers (17) from studs (18). Use tail rotor torque adapter.

b. Discard nuts (16).

c. Remove head (2) from output shaft (15).



B. **CLEANING**

Clean drive links, tail rotor head, tail rotor gearbox output shaft and surrounding area (para 1-5-36).

C. **INSPECTION**

1. **Check tail rotor head for damage, and corrosion** (para 5-3-11).

2. **Check studs for thread damage.** None allowed.

3. **Check drive links** (para 11-5-1).

4. **Check tail rotor gearbox output shaft for wear, nicks, gouges, scratches, and hole elongation** (para 6-6-1).

END OF TASK

5-3-9. TAIL ROTOR HEAD INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 3/8-inch Drive	5120-00-821-3441
Wrench, Torque, 1/4 Drive	5120-00-542-4489
Stand, Maintenance	1730-00-269-8283
Kit, Special Tool	4920-01-100-7613

Materials/Parts:

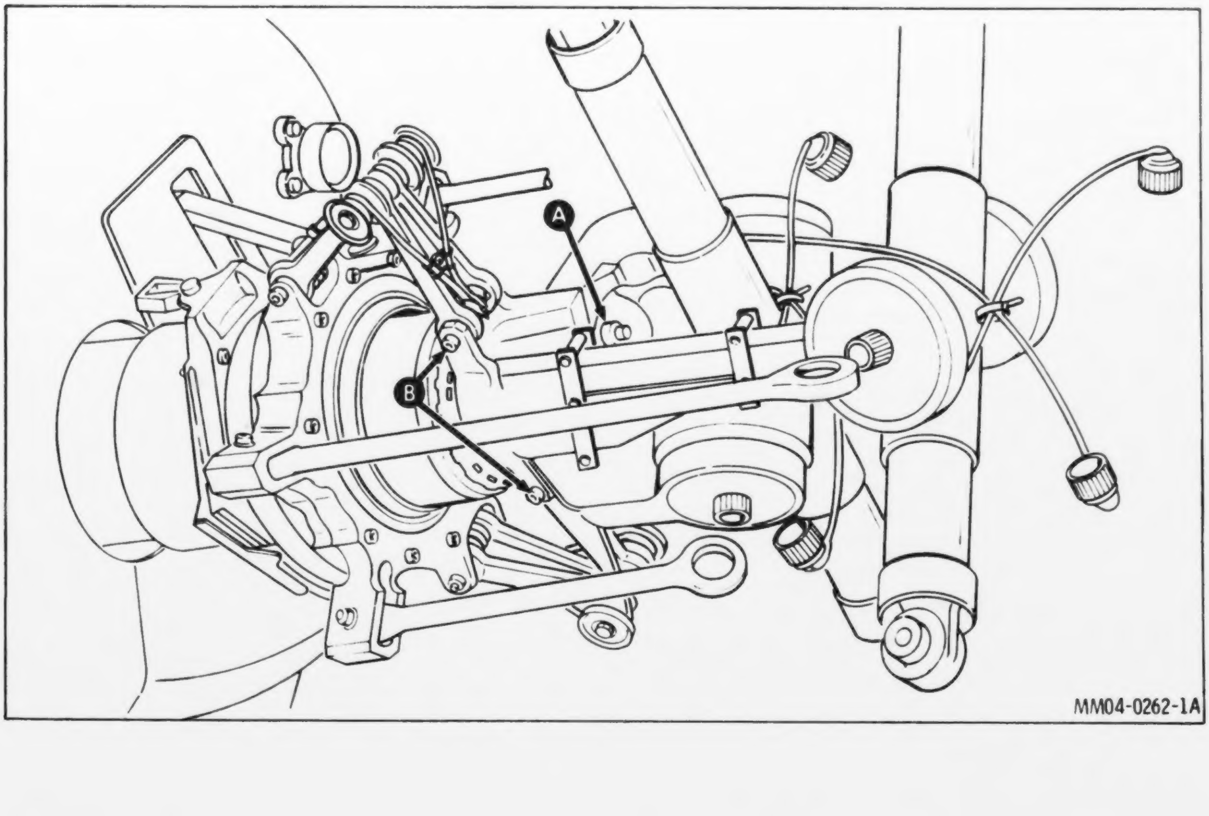
Cotter Pin (2)

Personnel Required:

67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



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5-3-9. TAIL ROTOR HEAD INSTALLATION (cont) 5-3-9

WARNING

Tail rotor head weighs approximately 40 pounds. Two persons are needed for handling. If injury occurs, seek medical aid.

CAUTION

The tail rotor gearbox output shaft mounting studs are offset. Do not force tail rotor head on mounting studs. If binding occurs, remove and realine tail rotor head.

1. **Install rotor head (1) on tail rotor gearbox output shaft (2) with mounting holes alined.** Torque three nuts to **750 INCH-POUNDS.**

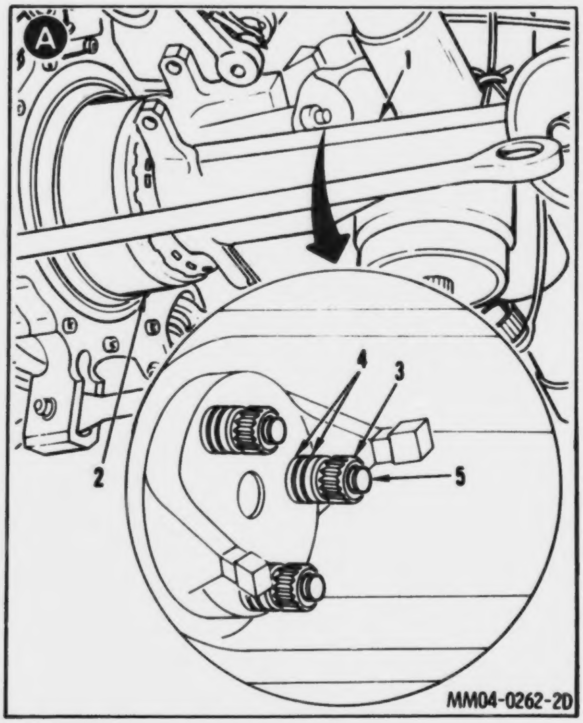
   a. Install head (1) on shaft (2) with mounting holes alined.

   b. Install six washers (4): two on each stud (5).

   c. Install three new nuts (3).

   d. Torque three nuts (3) to **750 INCH-POUNDS.** Use 3/8-inch drive torque wrench.

   e. Check that each nut has 2-1/2 stud threads showing. If not, remove one washer and repeat steps c. and d.



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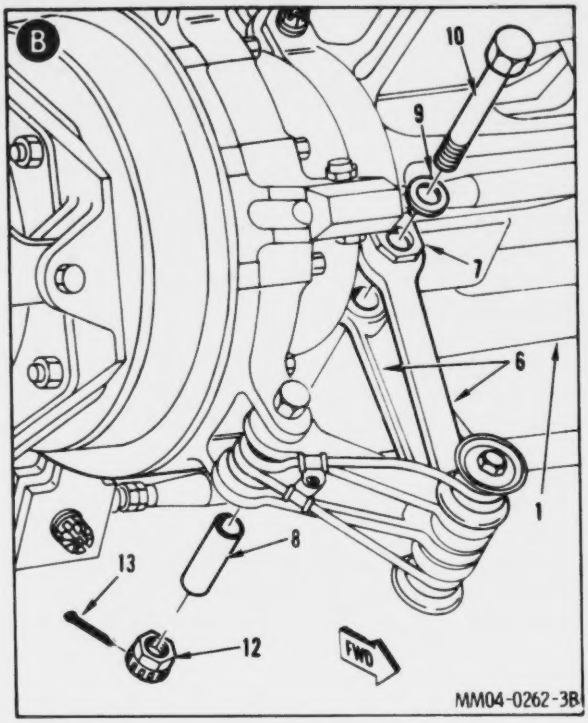
5-3-9. TAIL ROTOR HEAD INSTALLATION (cont) 5-3-9



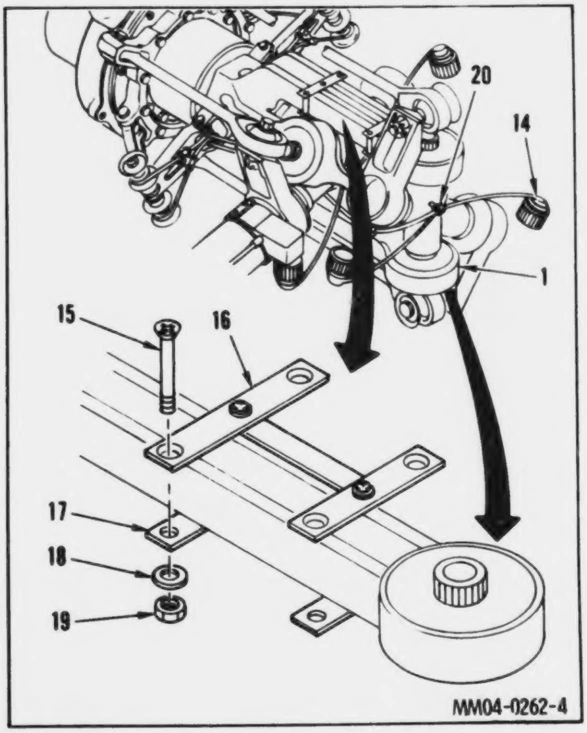
2. **Install two drive links (6) on tail rotor head (1).**
   a. Position two links (6) between lugs of each clevis (7).
   b. Install two bushings (8) through clevis (7) and two links (6).

NOTE

Washer must always be installed on the side of the clevis with the small hole.

   c. Install two washers (9) and two bolts (10), with heads of both bolts (10) facing direction of rotation.
   d. Install two nuts (12).
3. **Torque two nuts (12) to 30 to 40 INCH-POUNDS.**
   a. Hold two bolts (10). Torque two nuts (12) to 30 **INCH-POUNDS**. Use 1/4 drive torque wrench and tail rotor torque adapter.
   b. If cotter pin hole is not alined, increase torque to aline. Do not exceed 40 **INCH-POUNDS**.
   c. Install cotter pin (13).
4. **Attach de-ice harness (14) two places.**
   a. Install eight screws (15) through two brackets (16) and two brackets (17).
   b. Install eight washers (18) and eight nuts (19).
   c. Install tiedown strap (20) two places.
5. **Inspect (TI).**
6. **Install tail rotor blades (para 5-3-4).**

END OF TASK



5-3-10. TAIL ROTOR BLADE BALANCE WEIGHT REMOVAL/INSTALLATION 5-3-10

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-542-4489

Materials/Parts:

Balance Weight	1615-01-170-7472
Balance Weight	1615-01-170-7471
Balance Weight	1615-01-170-7470

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

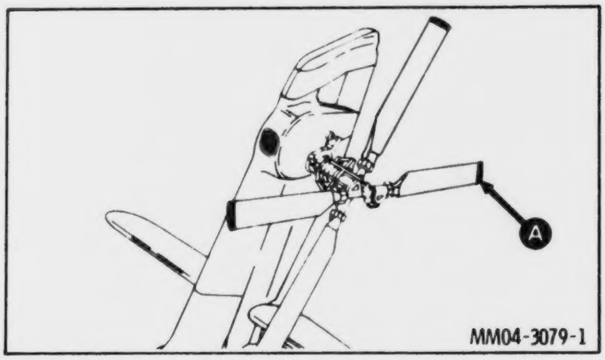
TM 55-1520-238-T

Equipment Conditions:

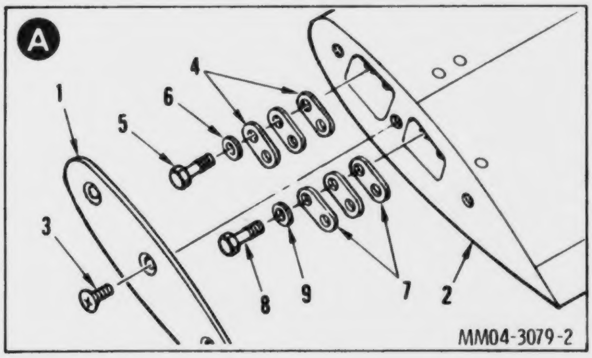
Ref	Condition
1-7-2	Helicopter safed

A. REMOVAL

1. **Remove tail rotor blade tip cap (1) from rotor blade (2).** Remove three screws (3).



2. **Remove leading edge weights (4).**
    a. Remove two bolts (5) and two washers (6).
    b. Remove leading edge weights (4).
3. **Remove trailing edge weights (7).**
    a. Remove two bolts (8) and two washers (9).
    b. Remove trailing edge weights (7).



B. CLEANING

Clean all attaching parts (para 1-5-36).

C. INSPECTION

Check bolts and weights for corrosion. None allowed (para 1-5-38).

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5-3-10. TAIL ROTOR BLADE BALANCE WEIGHT REMOVAL/INSTALLATION (cont) 5-3-10

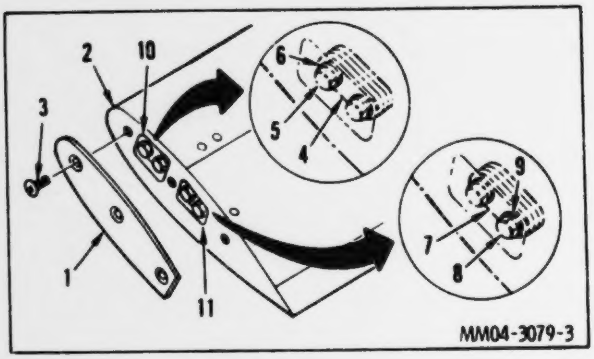
D. INSTALLATION

NOTE

Weights are added or subtracted to balance tail rotor according to balancing procedures. One half of required weight correction should be made at each mount point.

1. **Install leading edge weights (4).** Torque bolts (5) to **90 INCH-POUNDS.**
   - a. Position and hold weights (4) in leading edge mount point (10).
   - b. Install two washers (6) and two bolts (5). Torque bolts (5) to **90 INCH-POUNDS.**
2. **Install trailing edge weights (7).** Torque bolts (8) to **90 INCH-POUNDS.**
   - a. Position and hold weights (7) in trailing edge mount point (11).
   - b. Install two washers (9) and two bolts (8). Torque bolts (8) to **90 INCH-POUNDS.**
3. **Inspect (TI).**
4. **Record amount of weights (4) and (7) installed and blade identification on tail rotor balance chart** (TM 55-1520-238-T).
5. **Inspect (TI).**
6. **Install blade tip cap (1) on tail rotor blade (2).** Install three screws (3).
7. **Inspect (TI).**
8. **Perform tail rotor balance operational check** (TM 55-1520-238-T).

END OF TASK



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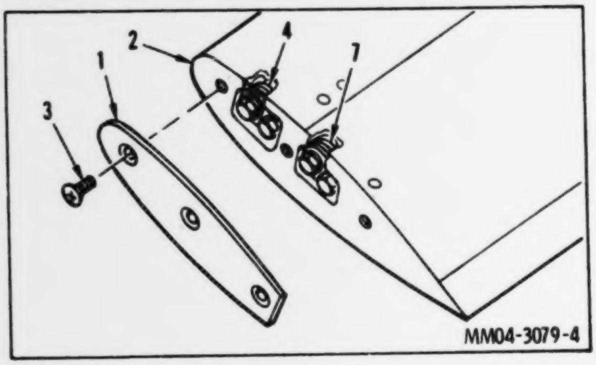

MM04-3079-4

5-3-11. TAIL ROTOR HUB ASSEMBLY REMOVAL/INSTALLATION (AVIM) 5-3-11

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Powertrain Repairer's	5180-00-003-5267
Fixture Assembly Repair, Tail Rotor Head	4920-01-226-7423
Tail Rotor Strap Pack, Centering Kit	7-363100003-603
V-Blocks	3460-01-093-0129
Thickness Gage (3)	5120-00-221-1999
Wrench, Torque 3/8 Drive	5120-00-288-8865
Gage, Vernier	5120-00-067-7118
Level, Pression Master	5220-00-241-3609
Socket, 11/16 1/2 Drive	5120-00-935-7421
Socket, 13/16 1/2 Drive	5120-00-935-7423
Adapter, Socket, Wrench, 1/2, 3/4 Drive	5120-00-227-8088
Wrench, Torque 3/4 Drive	5120-00-902-3550
Marker, China	7510-00-264-4612
Caliper, Inside	5120-00-221-1921

Materials/Parts:

	Bolt (2)
	Bolt, Spare (2)
	Washer (4)
	Nut (2)
	Spacer (as required)
(E11)	Primer, Sealant
(E14)	Lubricant, Thread
(E68)	Brush
(E93)	Sealing Compound

Personnel Required:

68D10	Aircraft Powertrain Repairer
66R30	Inspector/Supervisor

References:

TM 55-1500-345-23

NOTE

This task applies to upper and lower hub and strap removal and installation.

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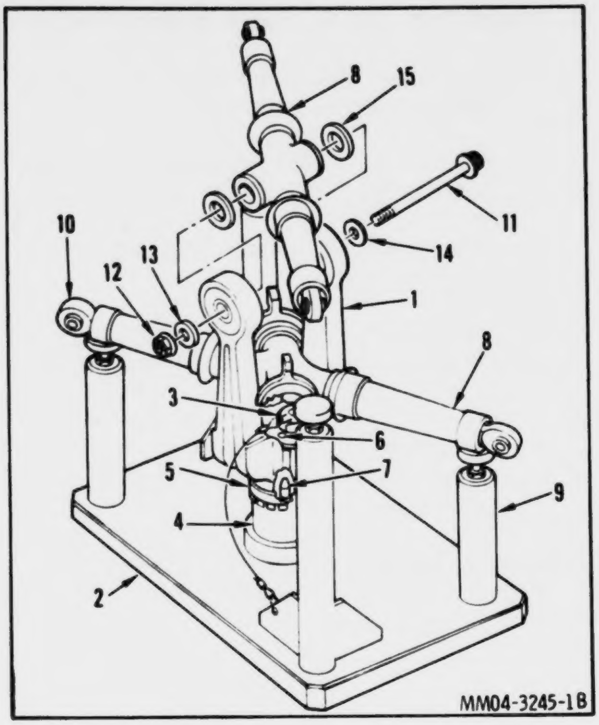
5-3-11. TAIL ROTOR HUB ASSEMBLY REMOVAL/INSTALLATION (AVIM) (cont) 5-3-11

A. REMOVAL



1. **Position tail rotor head (1) on tail rotor fixture (2).**
   - a. Remove nut (3) from pedestal (4).
   - b. Guide fork (5) over pedestal (4).
   - c. Rotate fork (5) around pedestal (4) to aline arms of hubs (8) with correct set of uprights (9).
   - d. Aline any one of three holes (6) on fork (5) with guide pin (7) on pedestal (4) and lower fork onto pedestal.
   - e. Hand tighten nut (3) on pedestal (4).
2. **Remove hub (8) and strap (10) from fork (5).**
   - a. Hold bolt (11).
   - b. Remove and discard nut (12) and washer (13).
   - c. Remove and discard bolt (11) and washer (14).
   - d. Remove spacers (15).
   - e. Remove hub (8) and strap (10) from fork (5).

GO TO NEXT PAGE

3. Place hub (8) in two V-blocks (16).

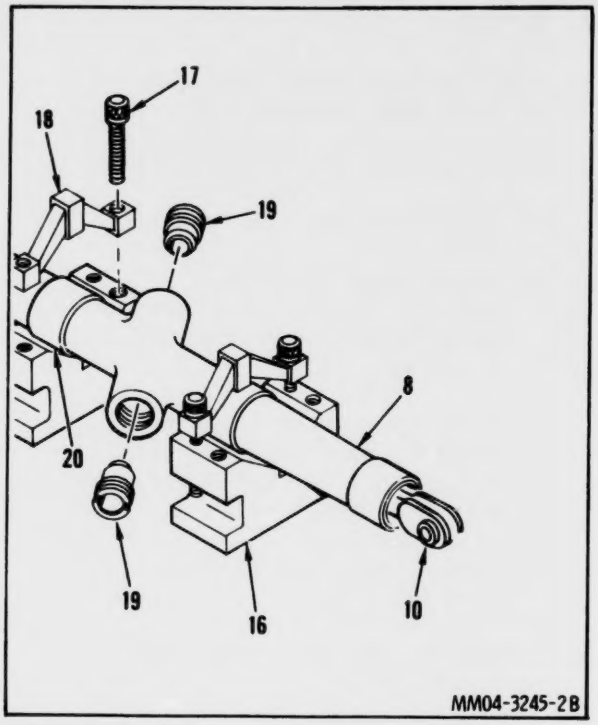
a. Place two V-blocks (16) on flat, smooth, level surface.

b. Remove four thumb screws (17) and two clamps (18) from V-blocks (16).

c. Aline collar of hub (20) with V-blocks (16).

d. Install four thumb screws (17) through two clamps (18) and into two V-blocks (16).

e. Hand tighten four thumb screws (17) until clamps (18) secure hub (8).



MM04-3245-2B

4. Remove threaded bushings (19). Use torque adapters supplied in centering kit.

CAUTION

To prevent internal hub damage, remove strap carefully.

5. Remove strap (10) from hub (8).

6. Remove lower hub (8) and strap (10) from fork (5) following steps A2 thru A5.

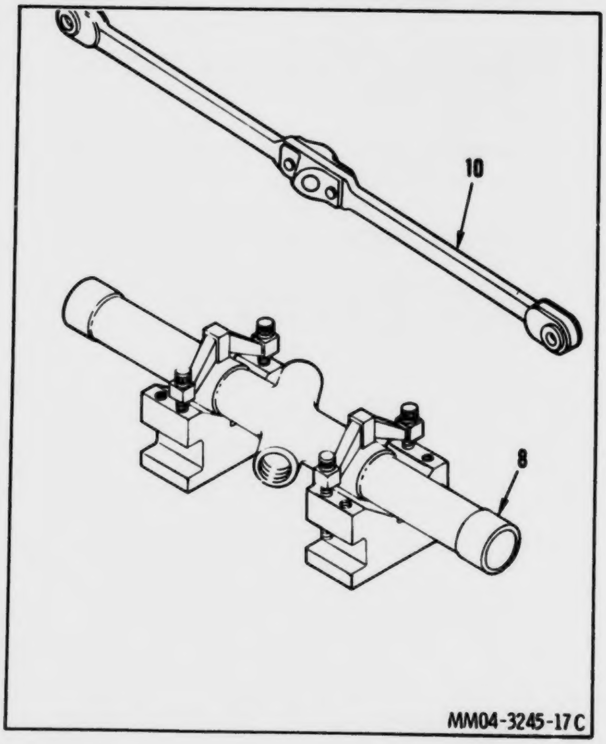
B. CLEANING

Clean fork, strap, hub, and threaded bushings (para 1-5-36).

C. INSPECTION

1. Check fork for nicks, cracks, scratches, and corrosion (para 5-3-12).

2. Check four rubber bumpers for looseness, splits, or deterioration. None allowed.



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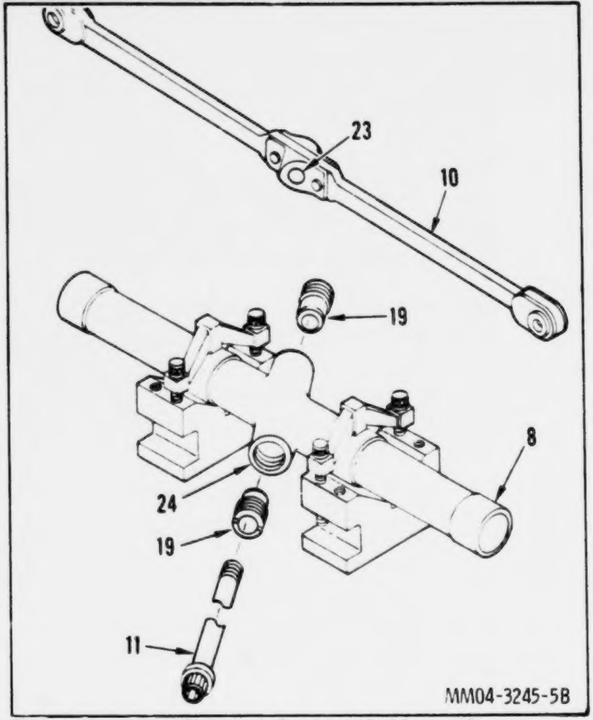
5-3-11. TAIL ROTOR HUB ASSEMBLY REMOVAL/INSTALLATION (AVIM) (cont) 5-3-11



3. **Check four bearings for condition and looseness** None allowed (para 5-3-12).

4. **Check strap for broken, loose, deformed, or cracked straps.** None allowed.

5. **Check strap for corrosion** (para 1-5-38).

   o Strap laminates

   Pits not allowed

   Discoloration clean per (1-5-36).

   o Inboard shoes:

   0.005 on outer surface and on diameter of teetering hole.

   o Outboard shoes:

   0.005 overall

6. **Check threaded bushings and teetering bolts for cracks or damaged threads.** None allowed.

7. **Check threaded bushings and teetering bolts for corrosion.** None allowed (para 1-5-38).

8. **Check hub for cracks and damaged threads.** None allowed.

9. **Check hub for scratches, dings, dents, and corrosion located within 3 inches from center of hub may be blended but damage not to exceed 0.020 INCH.**

10. **Check tail rotor fork for scratches, gouges, and dents** (para 5-3-12).

D. INSTALLATION

CAUTION

To prevent internal hub damage, install strap carefully.

1. **Install strap (10) in hub (8).**

   a. Aline holes (23) of strap (10) with holes (24) of hub (8).

   b. Install threaded bushings (19). Insert bolt (11) through hub (8), threaded bushings (19), and strap (10). Use bolt (11) for alinement.

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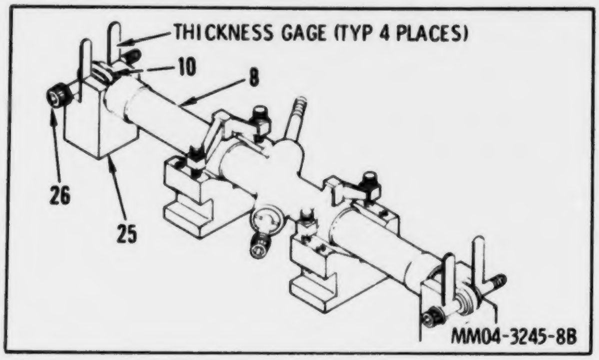
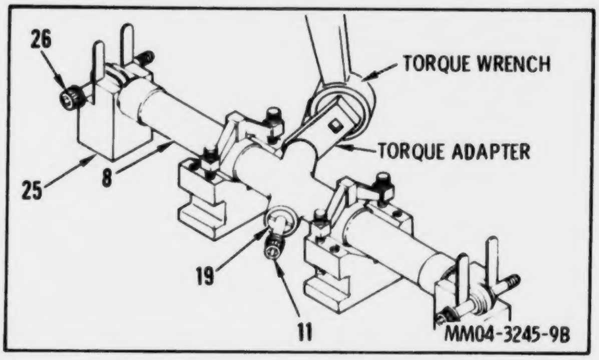
5-3-11. TAIL ROTOR HUB ASSEMBLY REMOVAL/INSTALLATION (AVIM) (cont) 5-3-11





c. Place gage blocks (25) under each end of strap (10) so long end of gage block (25) contacts each end of hub (8).

d. Install spare bolts (26) through each end of strap (10). Position smooth portion of spare bolts (26) against each gage block (25).

e. Use thickness gage four places to shim clearance between gage blocks (25) and spare bolts (26). Use enough gage thickness to stretch strap (10) tight in hub (8).

NOTE

- Bolt used for alinement must move freely in hub.
- The thickness between gage block and spare bolts at each end of hub and strap is to be within 0.005 inch.
- Allow primer (E11) 30 minutes at ambient temperature to dry.

f. Remove bolt (11) and threaded bushings (19) from hub (8). Apply primer (E11) to threads of bushing (19) and threads of hub (8). Use brush (E68) and primer (E11).

g. Apply sealant (E93) to threads of threaded bushings (19). Use clean brush (E68).

NOTE

Bushings should be evenly started in hub until finger tight.

h. Start threaded bushings (19) in hub (8). Use torque adapter in centering kit.

i. Insert bolt (11) through threaded bushings (19), hub (8), and strap (10). Use bolt (11) for alinement.

GO TO NEXT PAGE

5-3-11. TAIL ROTOR HUB ASSEMBLY REMOVAL/INSTALLATION (AVIM) (cont) 5-3-11

CAUTION

To ensure proper strap alinement, torque bushings evenly.

2. **Alternately torque each threaded bushing (10) in 25 INCH-POUND increments until final torque of 40 to 60 INCH-POUNDS is reached on each bushing (19).** Use torque adapter in centering kit and 3/8 drive torque wrench.

3. **Inspect (TI).**

4. **Remove four thickness gages, two spare bolts (26), alinement bolt (11), and two gage blocks (25).**

5. **Remove hub (8) and strap (10) from V-blocks (16).**

   a. Remove four thumb screws (17) and two clamps (18).

   b. Remove hub (8) and strap (10) from V-blocks (16).

6. **Identify one side of hub (8) as 1 and the other side as 2.** Use suitable marker.

NOTE

Refer to Table 5-5 to record data.

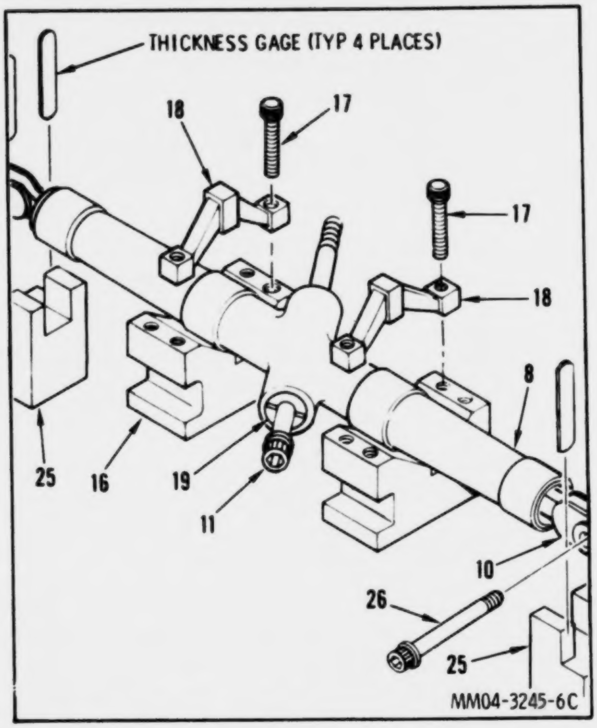
7. **Determine spacer thickness for hub (8).**

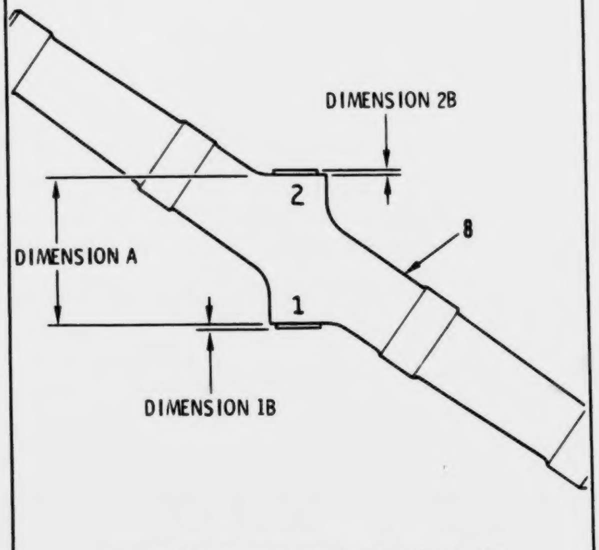
   a. Measure across hub (8) to obtain DIMENSION A.

      (1) Record DIMENSION A on line 1.

   b. On each side, measure from each hub surface to bushing (19) surface to obtain DIMENSION 1B and DIMENSION 2B.

      (1) Record DIMENSION 1B and DIMENSION 2B on line 2.





TAIL ROTOR HUB MEASUREMENTS (TYPICAL)

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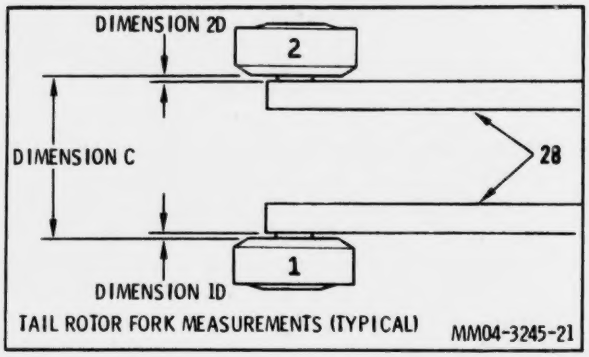
5-3-11. TAIL ROTOR HUB ASSEMBLY REMOVAL/INSTALLATION (AVIM) (cont) 5-3-11



TAIL ROTOR FORK MEASUREMENTS (TYPICAL) MM04-3245-21

c. Find center of hub assembly:

   (1) Divide DIMENSION A by 2. Record on line 3.

   (2) Add quotient recorded on line 3 to DIMENSION 1B. Record on line 4.

   (3) Add quotient recorded on line 3 to DIMENSION 2B. Record on line 5.

d. Identify forks 1 and 2 to match hub markings applied in step 6. Use suitable marker.

e. Measure distance between the inboard surfaces of lower fork (27) to obtain DIMENSION C. Record DIMENSION C on line 6.

f. Lay straight edge (28) across inboard surface of elastomeric bearing (29) and measure distance between straight edge and inboard surface of fork (27) to obtain DIMENSION 1D and DIMENSION 2D. Record DIMENSION 1D and DIMENSION 2D on line 7.

g. Find center of fork (27):

   (1) Divide DIMENSION C by 2. Record on line 8.

   (2) Subtract DIMENSION 1D from quotient recorded on line 8. Record difference on line 9.

   (3) Subtract DIMENSION 2D from quotient recorded on line 8. Record difference on line 10.

h. Subtract figure recorded on line 4 from figure recorded on line 9. Record difference on line 11.

i. Subtract figure recorded on line 5 from figure recorded on line 10. Record difference on line 12.

NOTE

- Allow **+.010** to **+.012 INCH** clearance on each side of hub and upper fork assemblies.
- Allow **+.002** to **+.003 INCH** clearance on each side of hub and lower fork assemblies.

GO TO NEXT PAGE

5-3-11. TAIL ROTOR HUB ASSEMBLY REMOVAL/INSTALLATION (AVIM) (cont) 5-3-11

j. Subtract proper precompression clearance (line 13 A or B) from figure recorded on line 11 to determine hub side #1 spacer stack thickness. Record difference on line 14.

k. Subtract proper precompression clearance (line 13 A or B) from figure recorded on line 12 to determine hub side #2 spacer stack thickness. Record difference on line 15.

8. **Inspect** (TI).

CAUTION

All bolts, washers, and nuts lubricated with MIL-L-23398 solid lubricant (E14) must be air dried for at least 6 hours before assembling parts.

NOTE

- To install hub and strap in lower fork, go to step 9.
- To install hub and strap in upper fork, go to step 14.
- All bolt measurements must be taken at the same point at each end. Points should be marked with a suitable marker.

9. **Assemble hub (8) and strap (10) into lower fork (27).**

   a. Measure and record length of bolt (11). Use vernier gage.

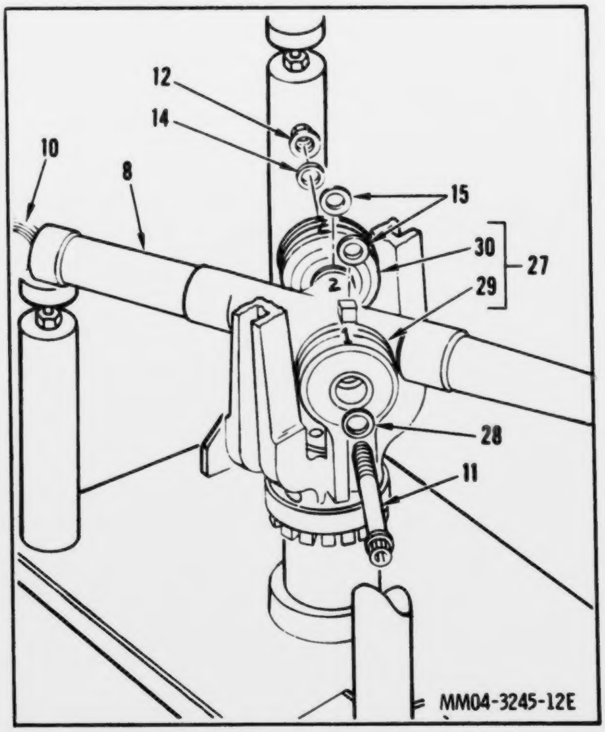
      (1) Record both lengths on line 16 of Table 5-5.

   b. Spray an even coat of lubricant (E14) on bolt (11), two new washers (14), (29), and new nut (12). Hold aerosol can 12 INCHES from work.

   c. Position hub (8) in fork (27) to match #1's and #2's.

   d. Install bolt (11) and washer (28) through #1 fork mount (29), #1 side spacer (15) stack, hub (8), strap (10), #2 side spacer (15) stack, and #2 fork mount (30).

   e. Install washer (14) and nut (12) finger tight.



GO TO NEXT PAGE

5-3-11. TAIL ROTOR HUB ASSEMBLY REMOVAL/INSTALLATION (AVIM) (cont) 5-3-11

10. Inspect (TI).

NOTE

Hubs must be level within **plus or minus 1/4 DEGREE** measured at centerline of hub.

11. **Level hub (8) by adjusting jack pads (31) on uprights (9) of fixture (2) within 1/4 DEGREE of horizontal.**

NOTE

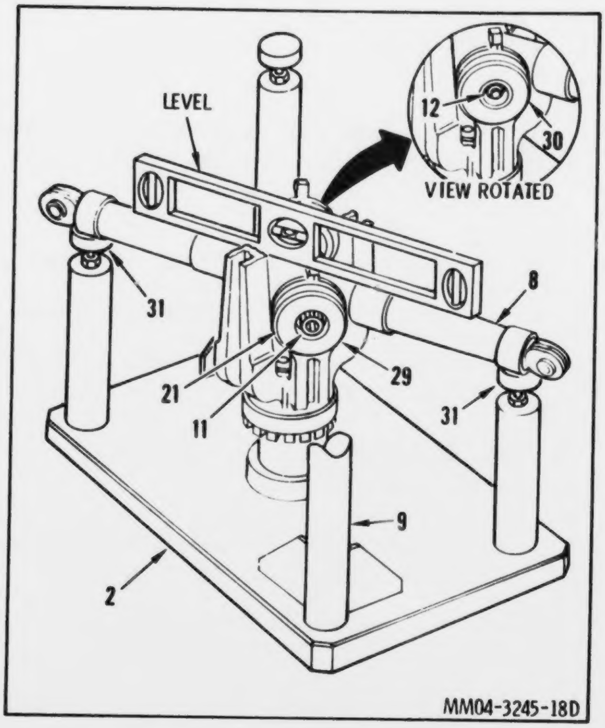
- Use caliper to measure bolt stretch.
- Initial torque of **3200 INCH-POUNDS** is required before bolt is elongated.

12. **Tighten nut (12) to stretch bolt (11) until bolt is between 0.017 INCH and 0.028 INCH longer than original length recorded on line 16 of Table 5-5. Use 1/2 drive, 13/16 socket, adapter, and 3/4 drive torque wrench.**

    a. Hold bolt (11). Use 1/2 drive 11/16 socket and 1/2 drive hinge handle.

CAUTION

Ensure that bearings (21) are not twisted in fork mounts while stretching bolt.



MM04-3245-18D

    b. If bolt (11) has been elongated beyond **0.028** to **0.032-INCH**, or bearing (21) has been twisted in fork mount (29, 30), remove nut (12) from bolt.

    c. After 15 minutes, remeasure bolt (11) to assure bolt has returned to original length recorded on line 16 of Table 5-5.

    d. If bolt has been elongated **0.033-INCH** or greater, discard nut and bolt. Repeat steps 8 thru 12.

GO TO NEXT PAGE

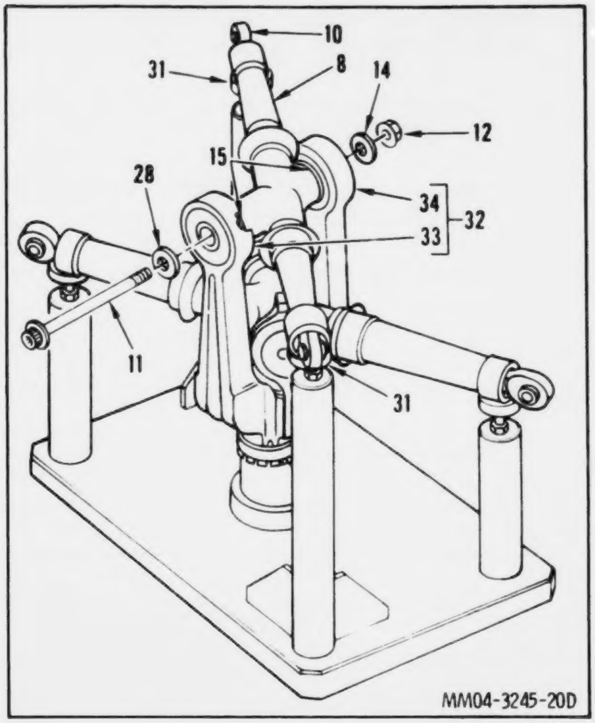
13. **Inspect (TI)**

CAUTION

All bolts, washers, and nuts lubricated with MIL-L-23398 solid lubricant (E14) must be air-dried for at least 6 hours before assembling parts.

NOTE

Spacer thickness for upper hub and upper fork will be measured the same as in Step 7. Allow clearance of **0.010/0.012 INCH** on each side of upper hub and upper fork for precompression of resilient bearings on installation.



14. **Assemble upper hub (8) and strap (10) into upper fork (32).**

    a. Measure and record length of bolt (11). Use vernier gage. Record bolt length on line 16 of Table 5-5.

    b. Apply (E14) lubricant to bolt (11), two new washers (14), (28), and nut (12). Hold aerosol can **12 INCHES** from work.

    c. Install bolt (11) and washer (28) through **#1** fork mounts (33), **#1** side spacer (15) stack, hub (8), strap (10), **#2** side spacer (15) stack, and **#2** fork mount (34).

    d. Install washer (14) and nut (12) on bolt (11).

15. **Level upper hub (8).** Repeat steps 11 and 12.

16. **Loosen four jack pads (31) on uprights (9) of fixture (2).** Verify hubs (8) are level. If hubs (8) are not level, repeat steps 11 thru 15.

GO TO NEXT PAGE

17. **Remove tail rotor head assembly (1) from tail rotor fixture (2).**

    a. Loosen and remove nut (3) from pedestal (4).

    b. Remove tail rotor head (1) from fixture (2).

18. Install tail rotor head (para 5-3-9).

TABLE 5-5

1. ______________________ DIMENSION A
2. 1B __________ 2B __________ DIMENSION 1B AND DIMENSION 2B
3. ______________________ 1/2 of #1
4. ______________________ Add #3 to DIMENSION 1B
5. ______________________ Add #3 to DIMENSION 2B
6. ______________________ DIMENSION C
7. 1D __________ 2D __________ DIMENSION 1D and DIMENSION 2D
8. ______________________ 1/2 of #6
9. ______________________ Subtract DIMENSION 1D from #8
10. ______________________ Subtract DIMENSION 2D from #8
11. ______________________ Subtract #4 from #9
12. ______________________ Subtract #5 from #10
13. Bearing Precompression Allowance
    A. Upper forks - .010 to .012 INCH (each side of hub)
    B. Lower forks - .002 to .003 INCH (each side of hub)
14. ______________________ #1 side shim. Subtract proper precompression allowance #13 (A or B) from #11.
15. ______________________ #2 side shim. Subtract proper precompression allowance #13 (A or B) from #12.
16. ______________________ Bolt length before torque.

END OF TASK

5-3-12. TAIL ROTOR FORK RESILIENT MOUNT REPLACEMENT (AVIM) 5-3-12

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Apron, Impermeable	8415-00-082-6108
Goggles	4240-00-052-3776
Gloves	6515-00-339-7900
Gloves, Rubber	8415-00-082-6108
Respirator, Air Filtering	4240-00-022-2524
Tool Kit, Tail Rotor Fork Resilient Mount	7-363100005

Personnel Required:

67R10 Attack Helicopter Repairer
66R30 Inspector/Supervisor

Materials/Parts:

(E31)	Cheesecloth
(E38)	Alcohol
(E58)	Tape, Pressure
(E68)	Brush
(E52)	Adhesive
(E75)	Abrasive Cloth, 320 grit
(E112)	Scouring Pad
	Line, Nylon Monofilament (0.30mm to 0.38mm)

Equipment Conditions:

Ref	Condition
5-3-10	Upper or lower tail rotor hub removed

NOTE

- This task is typical for all tail rotor fork resilient mounts.
- This procedure is valid for ambient temperatures of 50°F (10 °C) to 100 °F (38 °C).

GO TO NEXT PAGE

5-3-12. TAIL ROTOR FORK RESILIENT MOUNT REPLACEMENT (AVIM) (cont) 5-3-12

WARNING

To prevent freezing burns to skin, do not handle cold metal with bare hands.

CAUTION

If resilient mount cannot be removed from tail rotor fork by prescribed method, tail rotor fork must be removed from service and returned to depot.

NOTE

Install one removal tool on each resilient mount identified for removal before placing tail rotor fork in freezer.

A. REMOVAL

1. **Remove resilient mount (1) from tail rotor fork (2).** Use resilient mount tool kit. Do not exceed **900 INCH POUNDS** torque on nut (8).

   a. Hold sleeve (3) against face (4) of fork. Insert bolt (5) through sleeve (3) and mount (1).

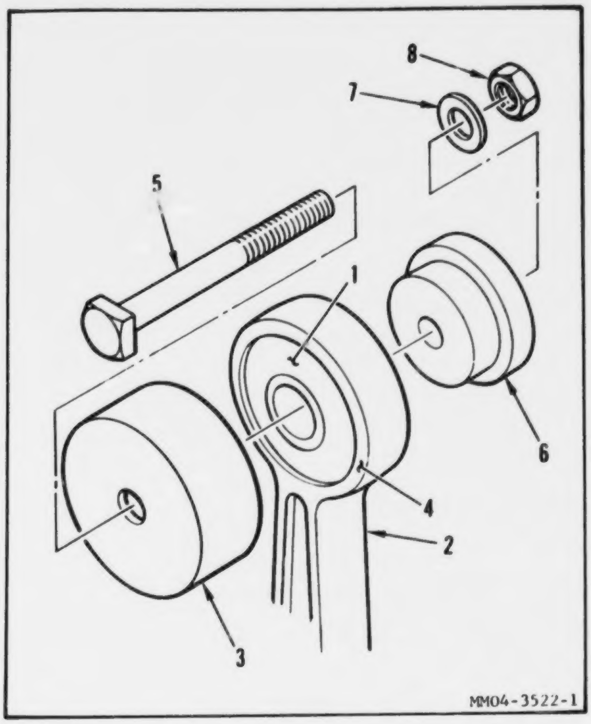
   b. Install pusher (6), washer (7) and nut (8) on bolt (5).

   c. Hold nut (8). Tighten bolt (5) until snug.

   d. Place fork (2) in freezer for approximately 6 to 7 hours at -20 °F (-29 °C), or lower.

   e. Remove fork (2) from freezer and immediately tighten nut (8) until mount (1) can be removed from fork (2) by hand. Do not exceed **900 INCH POUNDS.**

   f. Remove nut (8), washer (7), pusher (6), bolt (5), sleeve (3), and resilient mount (1) from fork (2).



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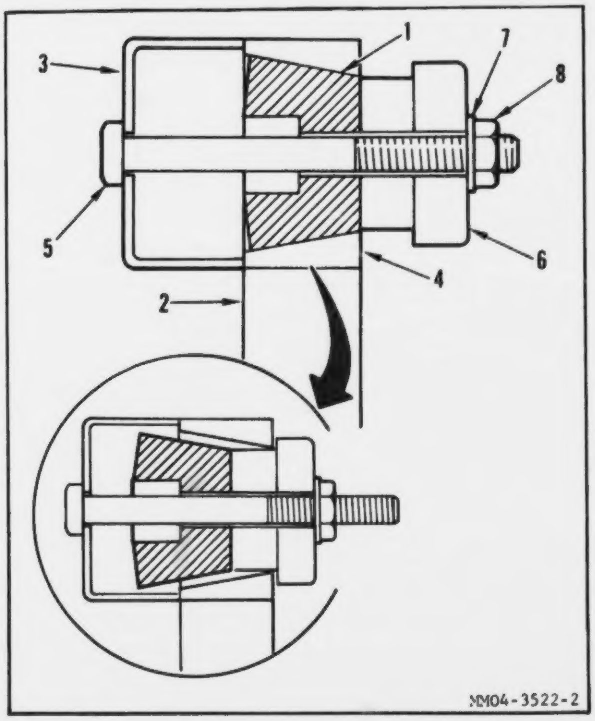

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B. CLEANING

WARNING

Solvent is flammable and toxic. Use in well ventilated area away from open flame. If solvent comes in contact with eyes or skin, flush with water. If irritation occurs, seek medical aid.

CAUTION

- Isopropyl alcohol is the only solvent that shall be used for cleaning or degreasing the resilient mounts.
- Ensure that all adhesive and fibers are removed from the faying surfaces of mount and fork.
- Contamination will result if resilient mount or tail rotor fork cavity are touched with bare hands.
- To prevent damage to the surfaces, do not use steel scrapers or brushes to remove old adhesive. Use an aluminum or plastic scraper.

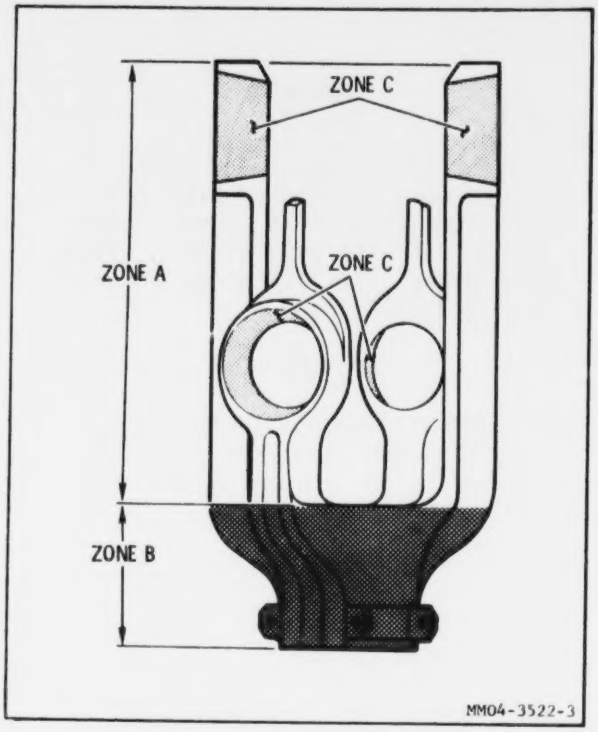
Clean outer resilient mount race and tail rotor fork cavity with scouring pad (E112), alcohol (E38) and cheesecloth (E31). If required, use abrasive paper (E69) to remove adhesive **FROM RESILIENT MOUNT** race, only.

GO TO NEXT PAGE

C. INSPECTION

NOTE

5X power magnifier is required for visual inspections.



1. **Check tail rotor fork for cracks.** None allowed.

2. **Check tail rotor fork for scratches, gouges, dents and corrosion.** Blend damaged areas. Do not attempt to blend if damage exceeds:

Zone A.	Surface damage not more than **0.001 INCH** deep.
Zone B.	Surface damage not more than **0.005 INCH** deep.
Zone C.	Surface damage not more than **0.010 INCH** deep and area not larger than **0.380 x 1.00 INCH** with edge distance of not less than **0.250 INCH.**

3. **Check resilient mount for deterioration and cracking.**
   - a. Check elastomeric bearing for evidence of black powdery discharge. This is evidence of deterioration of elastomeric compound. Elastomeric compound surface cracks are allowed over entire area.
   - b. Debonding along a circular shim is allowable to a maximum arc of 180°, one place only.
   - c. Radial cracking through shim not allowed.

4. **Check resilient mount outer race for damage. Curled edge or bulged surface not allowed**

GO TO NEXT PAGE

D. INSTALLATION

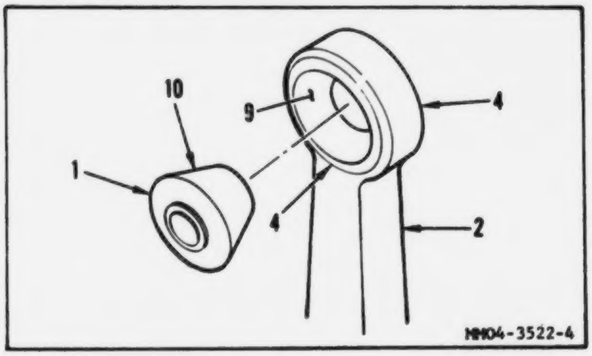
WARNING

Solvent is flammable and toxic. Use in well ventilated area away from open flame. If solvent comes in contact with eyes or skin, flush with water. If irritation occurs, seek medical aid.

CAUTION

- To prevent contamination, wear clean rubber gloves during installation.
- To prevent contamination, do not allow alcohol to evaporate after cleaning surfaces.
- To prevent improper mount installation, only one resilient mount is installed at a time. To install additional mounts, repeat procedure.

1. **Prepare tail rotor fork cavity (9) and resilient mount (1) for installation.**



NOTE

Do not mask surfaces to be bonded.

   a. Mask inner and outer faces (4) of fork (2) and mount (1). Use tape (E58).

   b. Clean fork cavity (9) and mount race (10). Use alcohol (E38) and clean cheesecloth (E31).

   c. Wipe cavity (9) and mount race (10) dry with clean cheesecloth (E31).

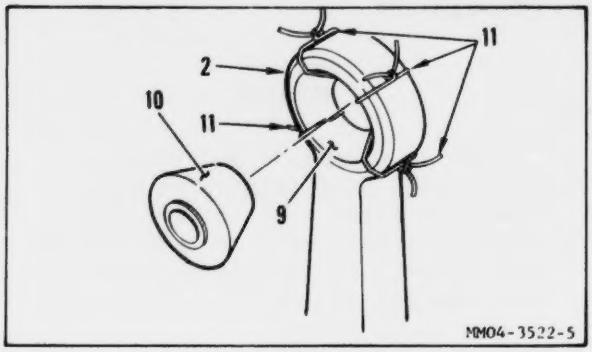
   d. Lightly abrade bearing cavity (9) and mount race (10). Follow machining marks around cavity and race. Use scouring pad (E112).

GO TO NEXT PAGE

5-3-12. TAIL ROTOR FORK RESILIENT MOUNT REPLACEMENT (AVIM) (cont) 5-3-12

e. Reclean fork cavity (9) and mount race (10). Use alcohol (E38) and clean cheesecloth (E31).

f. Wipe cavity (9) and mount race (10) with clean cheesecloth (E31). If any discoloration is visible on cheesecloth, repeat steps 1.a. thru f.



CAUTION

- Before using adhesive (E52) check container instructions for expiration dates. Do not use material if shelf life has expired.
- Parts coated with part A (resin) and parts coated with part B (activator) must not contact each other until final assembly is desired. Adhesive will bond immediately.

2. **Apply thin, continuous film of adhesive (E52) part B (activator) on resilient mount race (10).** Use clean brush (E68) and adhesive (E52).

3. **Set coated mount on a piece of clean cheesecloth (E31) with small end down.** Wait a minimum of 10 minutes to allow excess activator to drain off.

4. **Apply thick, continuous coat of adhesive (E52) part A (resin) to fork cavity (9).** Use clean brush (E68) and adhesive (E52).

5. **Position 4 precut monofilament lines (11) in part A of adhesive (E52) at equally spaced positions around fork cavity (9).** Secure with tape (E58) or tie off.

GO TO NEXT PAGE

CAUTION

- To prevent misalinement of resilient mounts, apply adhesive to only one mount at a time.
- Use the monofilament line, and the other resilient mount to center the mount being installed. Do not apply adhesive to the other fork cavity or the other resilient mount.
- Do not over-tighten compression nut.
- After adhesive coated parts are mounted, do not disturb assembly for 2 minutes.

6. **Install mount (1) in fork (2).**

   a. Install bolt (12) with washer (13) through opposite mount (1), fork (2) and mount (1) to be installed.

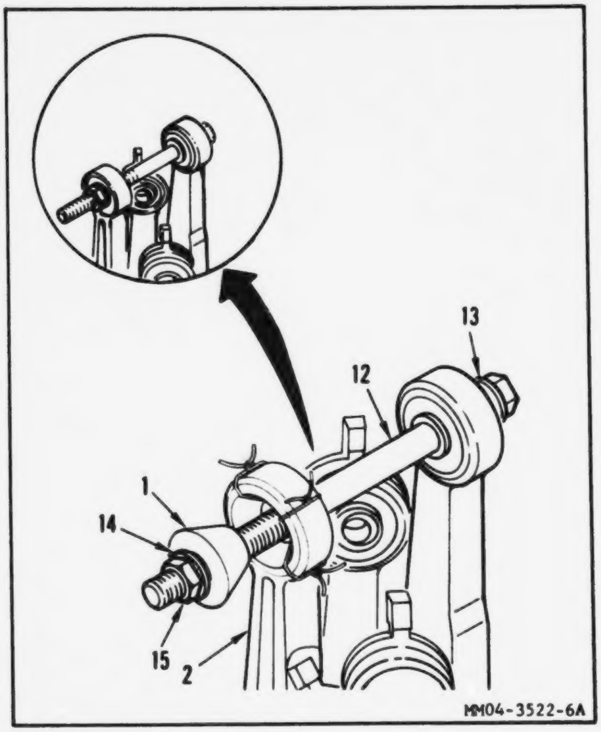
   b. With one quick motion, push the mount (1) into the fork cavity (9) and hold in place.

   c. Install compression washer (14) and nut (15) on bolt (12).

   d. Hold bolt (12) and mount (1) firmly in place, and tighten nut (15) just enough to prevent bolt from being rotated by hand.

   NOTE

   A uniform bead of adhesive should be visible around the circumference of the mount.



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   e. If opposite resilient mount (1) is to be installed on the same fork (2); after two minutes remove nut (15), washers (14) and (13), and bolt (12), and repeat steps 1 through 6.

   f. If resilient mount (1) is to be installed on another fork (2), repeat steps 1 through 6 without disturbing mounts already bonded into fork.

GO TO NEXT PAGE

7. **Trim monofilament line (11) so that 1/16 INCH protrudes from fork (2).**

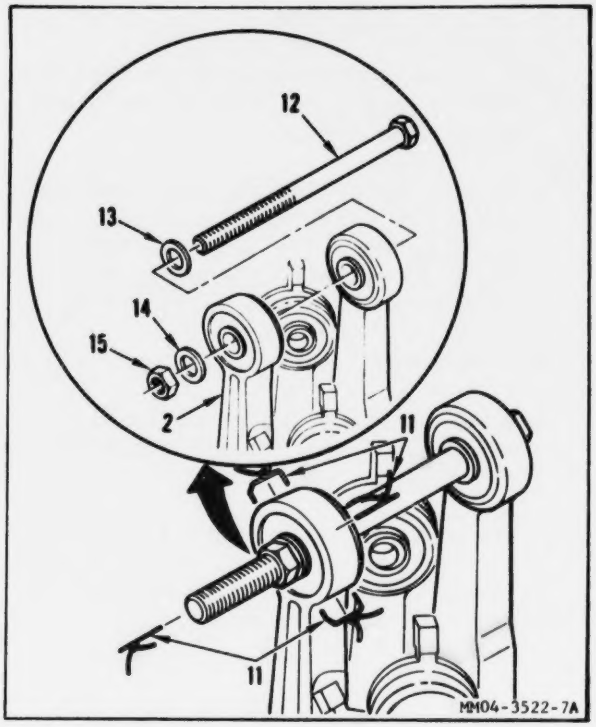
8. **Wipe excess adhesive from outer and inner faces of mount (1) and fork (2).** Use cheesecloth (E31) wetted with alcohol (E38).

NOTE

Allow adhesive to cure at room temperature 4 hours.

9. **Inspect (TI).**

10. **Remove resilient mount installation bolt (12) from tail rotor fork (2).** Remove nut (15), washer (14), washer (13) and bolt (12) from fork (2).



END OF TASK

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

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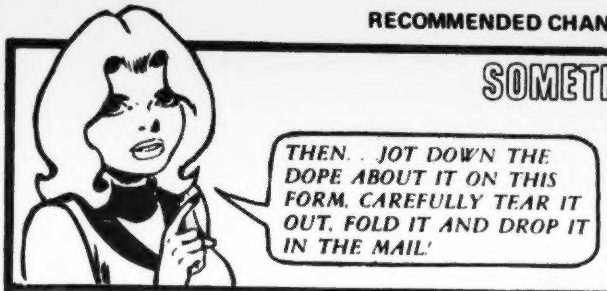
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PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
6	2-1 a			In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders.
81		4-3		Callout 16 on figure 4-3 is pointing at a bolt. In key to figure 4-3, item 16 is called a shim - Please correct one or the other.
125	line	20		I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket bit it doesn't fit. Supply says I got what I ordered, so the NSN is wrong. Please give me a good NSN

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

4-8-44. PILOT POWER QUADRANT PANEL - ENG NO. 1 INTERLOCK SWITCH REMOVAL/INSTALLATION (AVIM) (cont) 4-8-44

2. **Remove switch (6) from support plate (7).**

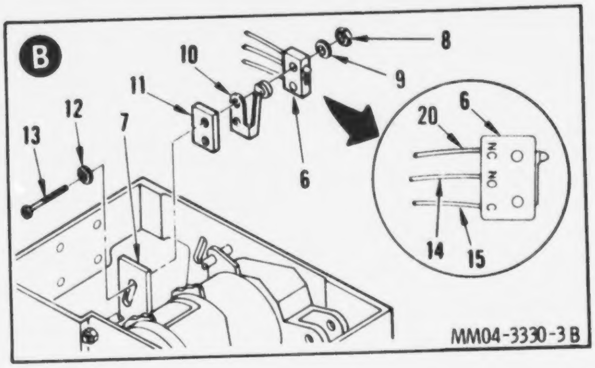
   a. Remove two nuts (8) and washers (9).

   b. Remove switch (6), switch actuator (10), spacer (11), two washers (12), and screws (13).

3. **Identify and remove wires (14) and (15).**

   a. Identify and depin wire (14) from connector J1 (16).

   b. Identify and remove wires (15) and (17) from wire caps (18). Discard wire cap (18).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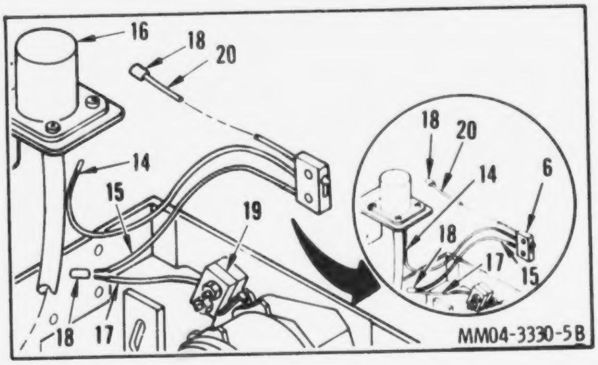
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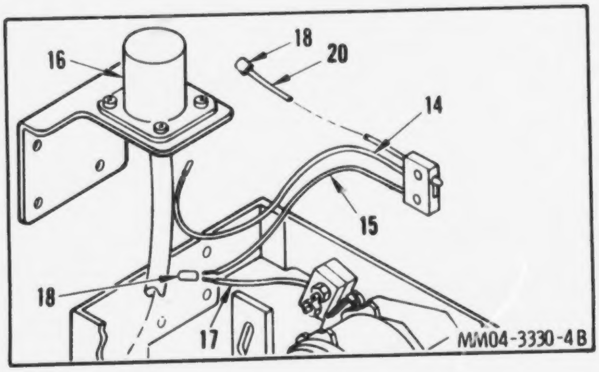
MM04-3330-5 B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MM04-3330-4 B

B. **CLEANING**

Wipe all removed and attaching parts with a clean dry rag.

C. **INSPECTION**

1. **Check mounting surfaces and attaching parts for cracks.** None allowed.

2. **Check wires for cuts, cracks, and damaged connections.** (TM 55-1500-323-24).

D. **INSTALLATION**

1. **Insert wire (14) from switch (6) into connector J1 (16). Attach wires (15), (17), and (21) into wire caps (18).**

   a. Insert wire (14) into connector J1 (16).

   b. Install new wire cap (18) on wire (15) from switch (6) and wire (17) from switch (19).

   c. Install new wire cap (18) on wire (20) from switch (6).

GO TO NEXT PAGE

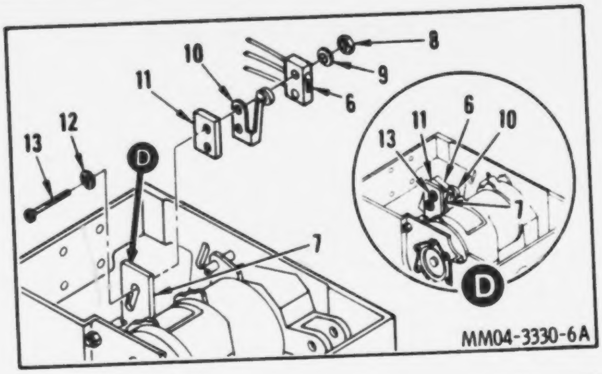
4-8-44. PILOT POWER QUADRANT PANEL - ENG NO. 1 INTERLOCK SWITCH REMOVAL/INSTALLATION (AVIM) (cont)

2. **Install interlock switch (6) onto support plate (7).**

   a. Install two washers (12), screws (13), spacer (11), switch actuator (10), and switch (6).

   b. Apply sealing compound (E119) to threads of two screws (13).

   c. Install two washers (9), and two nuts (8), do not tighten.



MM04-3330-6A

CAUTION

To prevent damage to interlock switch, ensure switch actuator does not bend excessively during switch closure, and that switch opens past the IDLE position.

3. **Adjust interlock switch (6).**

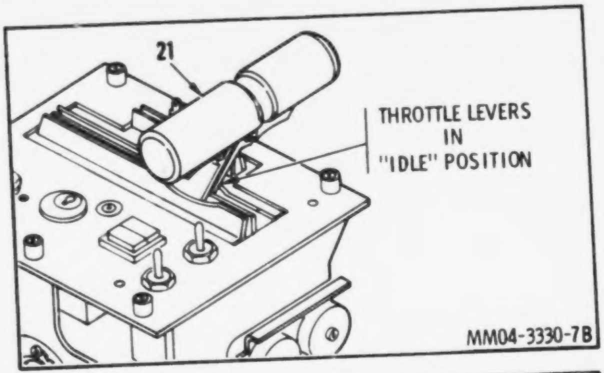
NOTE

Interlock switch will actuate only when engine No. 1 throttle lever is between OFF and IDLE.

   a. Set engine No. 1 throttle lever (21) to IDLE.

   b. Adjust interlock switch (6) so switch actuator (10) presses plunger (22), as far as it will go.

   c. Tighten two nuts (8).



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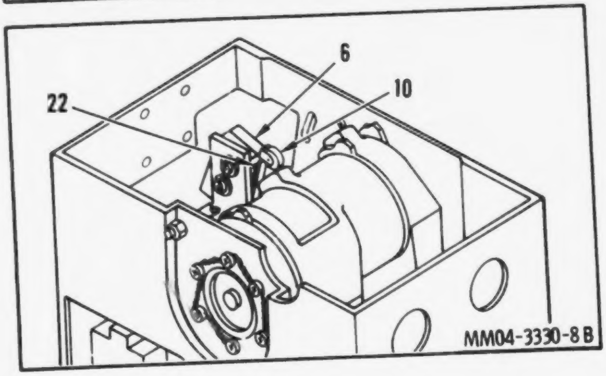

MM04-3330-8B

4. **Install required tiewraps.**

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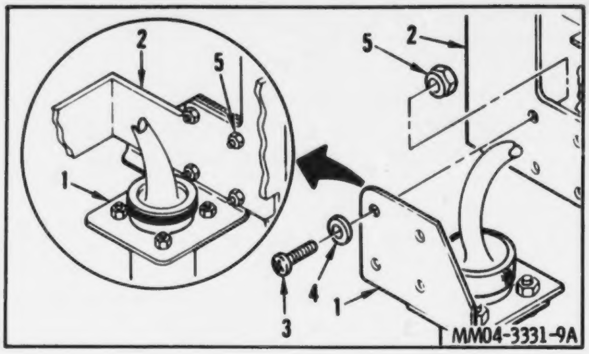
4-8-44. PILOT POWER QUADRANT PANEL - ENG NO. 1 INTERLOCK SWITCH REMOVAL/INSTALLATION (AVIM) (cont) 4-8-44



5. **Install bracket (1) on panel (2).** Install four washers (4), screws (3), and lock nuts (5).
6. **Inspect (TI).**
7. **Install pilot power quadrant indicating light panel** (para 4-8-39).
8. **Install pilot power quadrant** (para 4-8-21).
9. **Perform power plant operational check (engine 1 and engine 2)** (TM 55-1520-238-T).

END OF TASK

4-8-45. PILOT POWER QUADRANT PANEL - ENG NO. 2 INTERLOCK SWITCH REMOVAL/INSTALLATION (AVIM) 4-8-45

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915

References:

TM 55-1520-238-T
TM 55-1500-323-24

Materials/Parts:

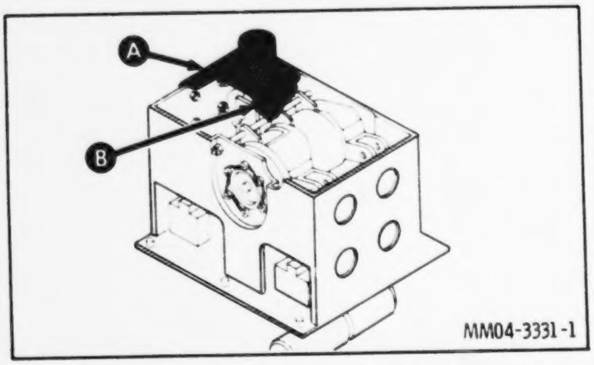
	Wire Cap (2)
(E119)	Compound, Sealing

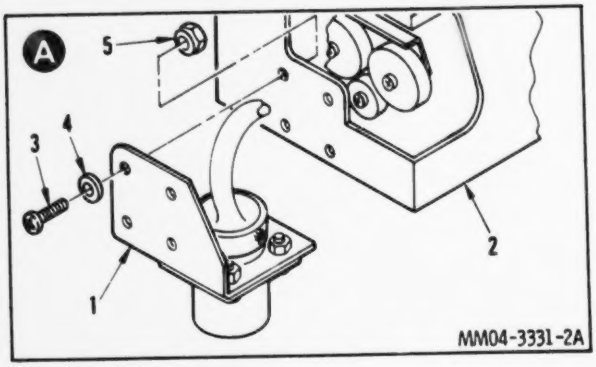
Personnel Required:

68F10	Aircraft Electrician
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-8-20	Pilot power quadrant removed
4-8-38	Pilot power quadrant indicating light panel removed





A. **REMOVAL**

1. **Removal bracket (1) from panel (2).**

   a. Remove four screws (3), washers (4) and lock nuts (5).

   b. Remove tiewraps as required.

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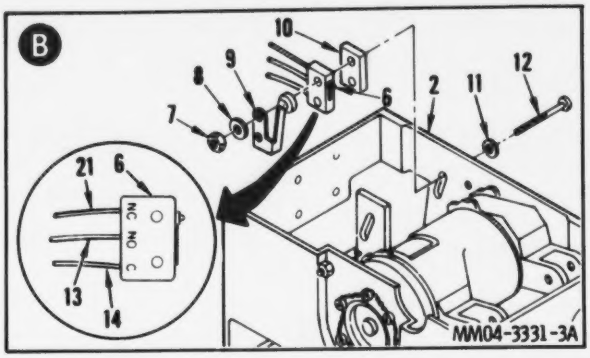
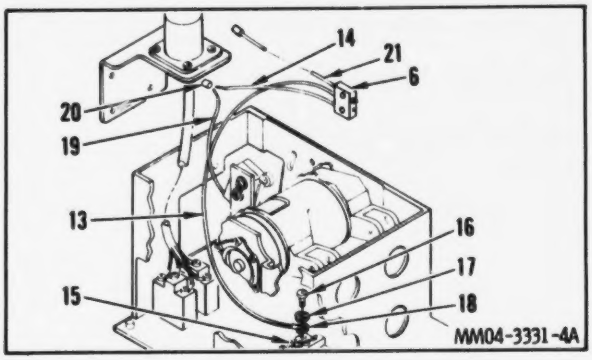
4-8-45. PILOT POWER QUADRANT PANEL - ENG NO. 2 INTERLOCK SWITCH REMOVAL/INSTALLATION (AVIM) (cont) 4-8-45





2. **Remove interlock switch (6) from panel (2).**

   a. Remove two nuts (7) and washers (8).

   b. Remove switch actuator (9), switch (6), spacer (10), two washers (11), and screws (12).

3. **Identify and remove wires (13) and (14).**

   a. Identify and remove wire (13) from RTR BRK switch (15). Remove screw (16), lock washer (17) and terminal lug (18).

   b. Identify and remove wire cap (20) from wires (14) and (19).

   c. Remove switch (6). Remove detached wires (13), (14), and (21) from panel (2).

B. CLEANING

Wipe all removed and attaching parts with a clean rag.

C. INSPECTION

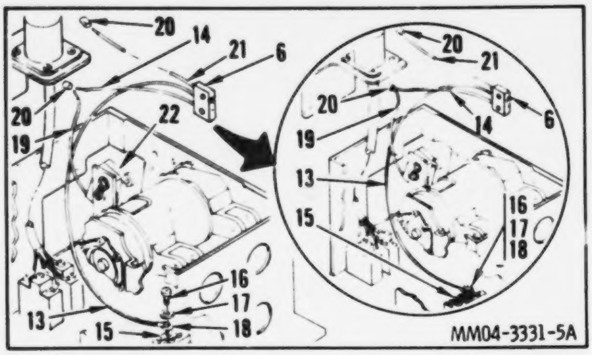
1. **Check mounting surfaces and attaching parts for cracks.** None allowed.

2. **Check wires for cuts, cracks, and damaged connections** (TM 55-1500-323-24).

GO TO NEXT PAGE

4-8-45. PILOT POWER QUADRANT PANEL - ENG NO. 2 INTERLOCK SWITCH REMOVAL/INSTALLATION (AVIM) (cont) 4-8-45

D. INSTALLATION



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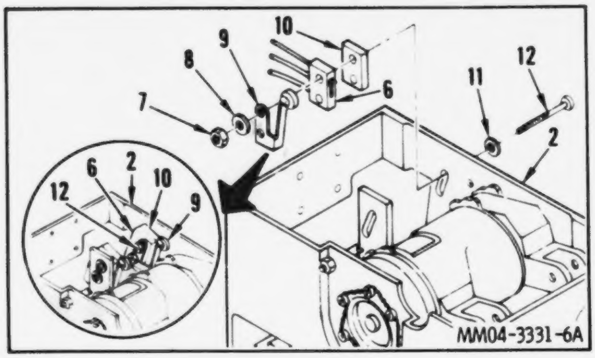


MM04-3331-6A

1. **Attach wire (13) from interlock switch (6) into connector J1 (16), and attach wires (14), (19), and (21) with wire caps (20).**

   a. Install terminal lug (18), lock washer (17), and screw (16) onto terminal 3 of RTR BRK switch (15).

   b. Install wire cap (20) onto wire (14) from switch (6) and wire (19) from switch (22).

   c. Install wire cap (20) onto wire (21) from switch (6).

2. **Install interlock switch (6) onto panel (2).**

   a. Install two washers (11), two screws (12), spacer (10), switch (6), and switch actuator (9).

   b. Apply sealing compound (E119) to threads of two screws (12).

   c. Install two washers (8) and nuts (7), do not tighten.

GO TO NEXT PAGE

4-8-45. PILOT POWER QUADRANT PANEL - ENG NO. 2 INTERLOCK SWITCH REMOVAL/INSTALLATION (AVIM) (cont) 4-8-45

CAUTION

To prevent damage to interlock switch, ensure that switch actuator does not bend excessively during switch closure, and that switch opens past the IDLE position.

3. **Adjust switch (6).**

NOTE

Interlock switch actuates only when engine No. 2 throttle lever is between OFF and IDLE.

   a. Set engine No. 2 throttle lever (23) to IDLE.

   b. Adjust interlock switch (6) so switch actuator (10) presses plunger (24) as far as it will go.

   c. Tighten two nuts (7).

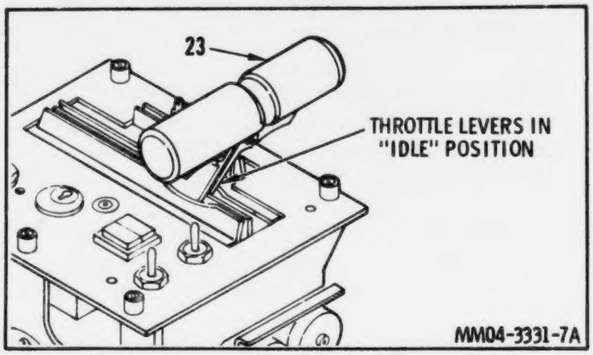
4. **Install bracket (1) on panel (2).** Install four washers (4), screws (3), and lock nuts (5).

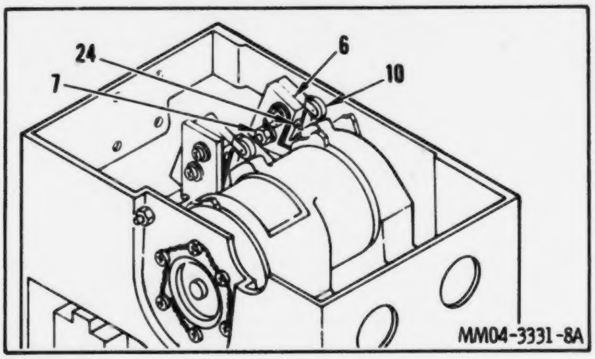
5. **Inspect (TI).**

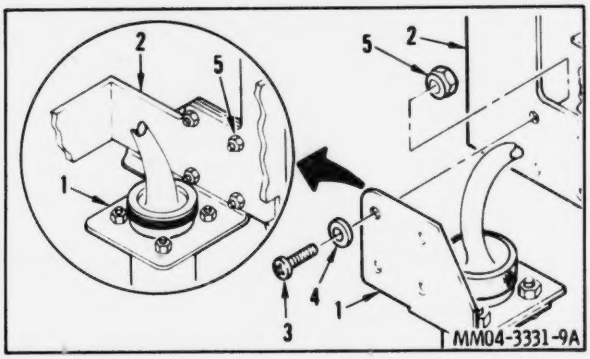
6. **Install pilot power quadrant indicating light panel** (para 4-8-39).

7. **Install pilot power quadrant** (para 4-8-21).

8. **Perform power plant operational check (engine 1 and engine 2)** (TM 55-1520-238-T).







END OF TASK

4-8-46. CPG POWER QUADRANT INDICATING LIGHT PANEL REMOVAL/INSTALLATION

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

References:

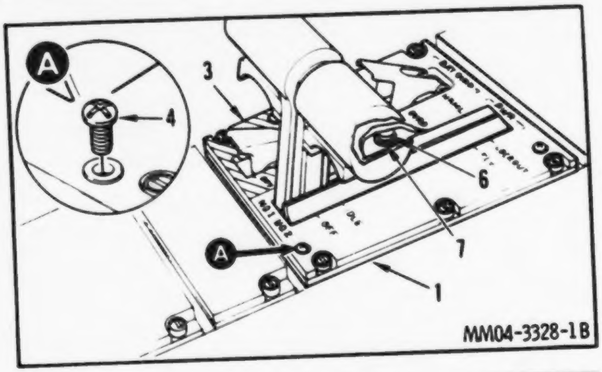
TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

A. REMOVAL

1. Enter CPG station (para 1-7-1). Observe all safety precautions.
2. On CPG power quadrant (1), move No. 1 and No. 2 power lever handles (2) to IDLE.
3. Remove indicating light transmitting panel (3) from CPG power quadrant (1).
    a. Remove four screws (4) from indicating light panel (3).
    b. Lift panel (3) from power quadrant (1) and turn 90 degrees.
    c. Aline slot (5) with handles (2) and lift panel (3).



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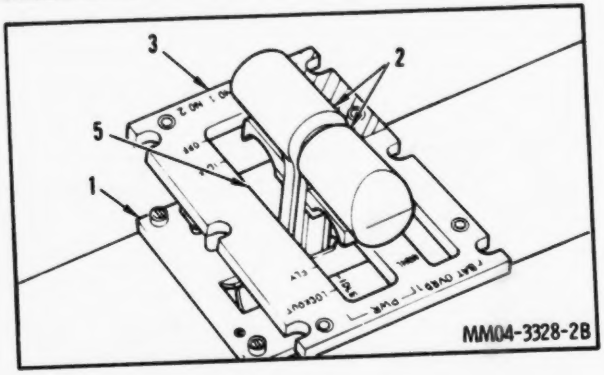


MM04-3328-2B

B. CLEANING

Wipe all removed and attaching parts with a clean rag.

GO TO NEXT PAGE

4-8-46. CPG POWER QUADRANT INDICATING LIGHT PANEL REMOVAL/INSTALLATION (cont)

C. INSPECTION

1. **Check panel (3) for cracks.** None allowed.

2. **Check indicating light transmitting panel connector (6) and connector (7) on power quadrant (1) for damage.** None allowed.

D. INSTALLATION

1. **Install panel (3) on power quadrant (1).**

   a. Aline slot (4) in panel (3) with power lever handles (2).

   b. Push panel (3) over power lever handles (2).

   c. Aline panel (3) with power quadrant (1).

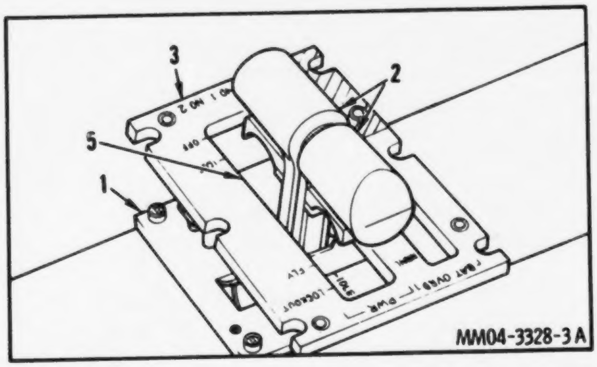
   d. Press panel (3) onto power quadrant (1) and ensure that connector (6) attaches to connector (7) on power quadrant (1).

   e. Install four screws (4).

2. **On CPG power qudrant (1), move No. 1 and No. 2 power lever handles (2) to OFF.**

3. **Inspect (TI).**

4. **Perform power plant operational check (engine 1 and engine 2) (TM 55-1520-238-T).**



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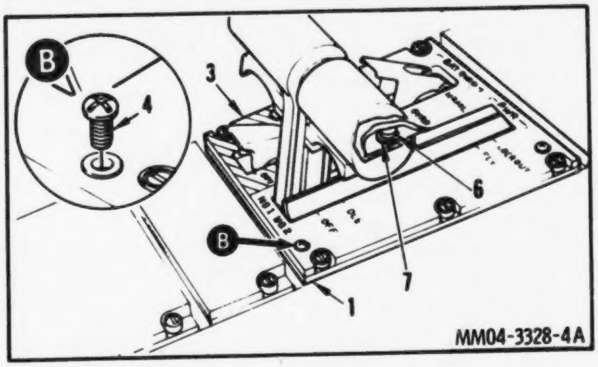

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END OF TASK

4-8-47. CPG POWER QUADRANT NO. 1 ENGINE OUT DISABLE SWITCH REMOVAL/INSTALLATION (AVIM)

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915

References:

TM 55-1520-238-T
TM 55-1500-323-24

Materials/Parts:

	Wire Cap
(E119)	Compound, Sealing

Equipment Conditions:

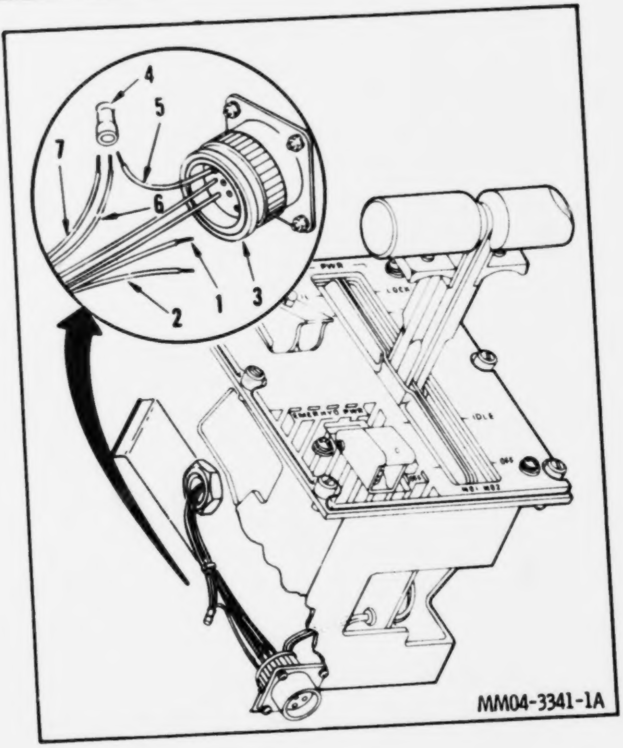
Ref	Conditions
1-7-2	Helicopter safed
4-8-22	CPG power quadrant removed

Personnel Required:

68F10	Aircraft Electrician
66R30	Inspector/Supervisor

A. REMOVAL

1. **Remove two engine No. 1 engine out disable switch wires (1) and (2) from connector J1 (3).**
   a. Identify two wires (1) and (2).
   b. Depin wire (1) from pin 2 of connector J1 (3).
   c. Depin wire (2) from pin 14 of connector J1 (3).
2. **Remove wire cap (4) from three engine out disable switch wires (5), (6), and (7).**
   a. Identify three wires (5), (6), and (7).
   b. Remove and discard wire cap (4).



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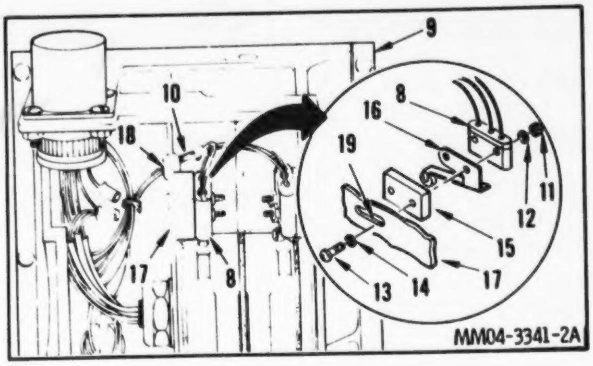
4-8-47. CPG POWER QUADRANT NO. 1 ENGINE OUT DISABLE SWITCH REMOVAL/INSTALLATION (AVIM) (cont) 4-8-47

3. Remove engine No. 1 engine out disable switch (8) from CPG power quadrant (9).

a. Remove tie down straps attaching wires of switch (8) to wire harness (10).

b. Remove two locknuts (11), two lock washers (12), two screws (13), two washers (14), spacer (15), switch actuator (16), and switch (8) from shaft support plate (17).

c. Pull wires of switch (8) through grommet (18) in shaft support plate (17).



B. CLEANING

Wipe all removed and attaching parts with a clean rag.

C. INSPECTION

1. **Check removed and attaching parts for cracks.** None allowed.
2. **Check wires for cuts, cracks, and damaged connectors.** (TM 55-1500-323-24).

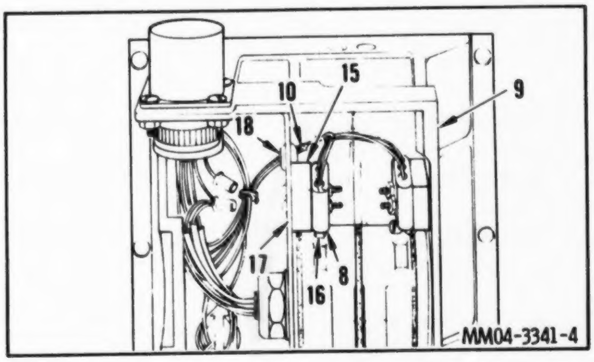
D. INSTALLATION

1. Install engine No. 1 engine out disable switch (8) on CPG power quadrant (9).

a. Insert wires of switch (8) through grommet (18) in shaft support plate (17).

b. Aline mounting holes of switch (8), switch actuator (16), and spacer (15) with slot (19) in shaft support plate (17).

c. Install two screws (13) with washers (14), lock washers (12), and locknuts (11). Tighten locknuts (11) finger tight.



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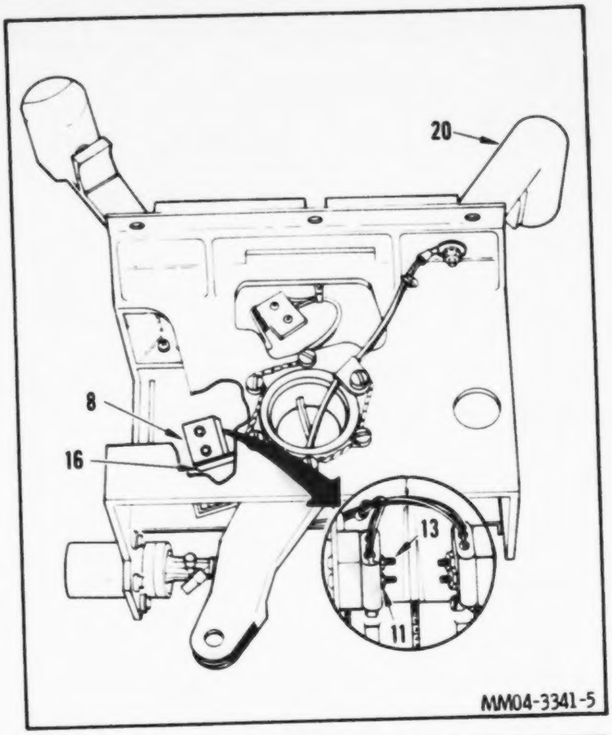
4-8-47. CPG POEWR QUADRANT NO. 1 ENGINE OUT DISABLE SWITCH REMOVAL/INSTALLATION (AVIM) (cont)

2. **Adjust lever (20) to actuate engine switch (8).** Ensure that switch actuator (16) does not overbend when power lever (20) is in the FLY position.

3. **Apply sealing compound to threads of screws (13). Tighten two locknuts (11).** Use compound (E119).



4. **Install new wire cap (4) on three wires (5), (6), and (7).**

5. **Attach two engine No. 1 engine out disable switch wires (1) and (2) to connector J1 (3).**

   a. Attach wire (1) to pin 2 of connector J1 (3).

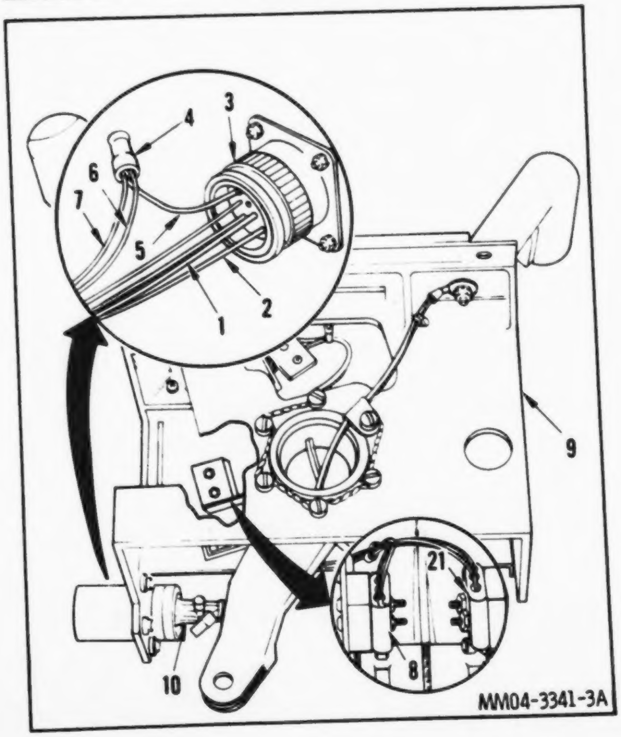
   b. Attach wire (2) to pin 14 of connector J1 (3).

6. **Install tiewraps as required.**

7. **Inspect (TI).**

8. **Install CPG power quadrant** (para 4-8-23).

9. **Perform power plant operational check (engine 1 and engine 2)** (TM 55-1520-238-T).



END OF TASK

4-8-48. CPG POWER QUADRANT NO. 2 ENGINE OUT DISABLE SWITCH REMOVAL/INSTALLATION (AVIM) 4-8-48

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915

Materials/Parts:

	Wire Cap (2)
(E119)	Compound, Sealing

Personnel Required:

68F10	Aircraft Electrician
66R30	Inspector/Supervisor

References

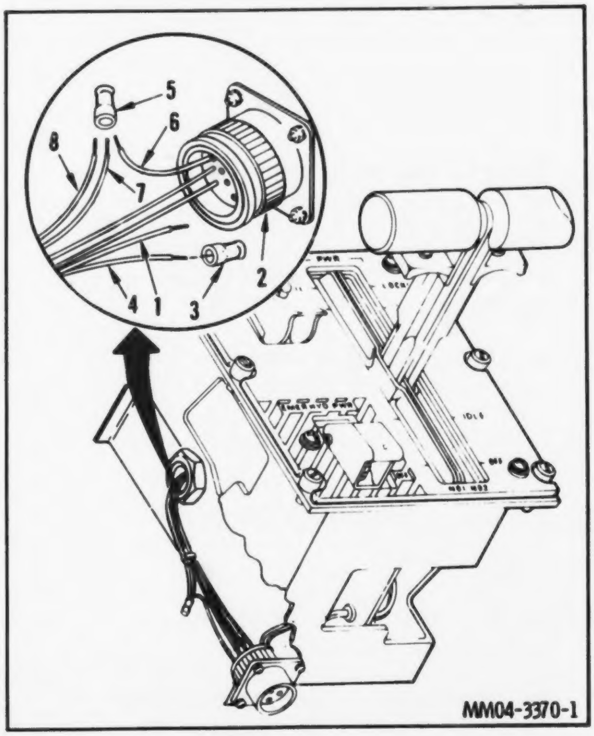
TM 55-1520-238-T
TM 55-1500-323-23

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-8-22	CPG power quadrant removed

A. REMOVAL

1. **Remove engine No. 2 engine out disable switch wire (1) from connector J1 (2).**
   a. Indentify wire (1).
   b. Depin wire (1) from pin 3 of connector J1 (2).
2. **Remove wire cap (3) from engine No. 2 engine out disable switch wire (4).**
   a. Identify wire (4).
   b. Remove and discard wire cap (3).
3. **Remove wire cap (5) from three engine out disable switch wires (6), (7), and (8).**
   a. Identify three wires (6), (7), and (8).
   b. Remove and discard wire cap (5).



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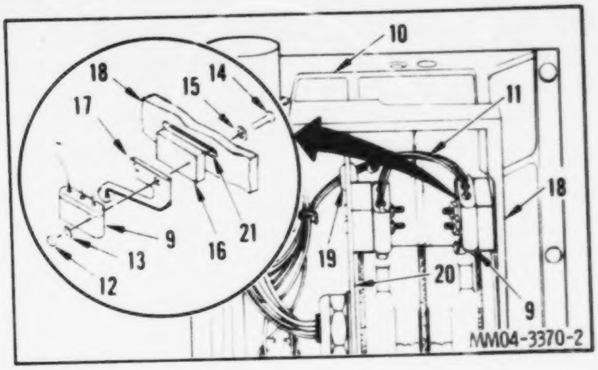
4-8-48. CPG POWER QUADRANT NO. 2 ENGINE OUT DISABLE SWITCH REMOVAL/INSTALLATION (AVIM) (cont)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MM04-3370-2

3. **Remove engine No. 2 engine out disable switch (9) from CPG power quadrant (10).**

   a. Remove tie-down straps attaching wires of switch (9) to wire harness (11).

   b. Remove two locknuts (12), lock washers (13), screws (14), washers (15), spacer (16), switch actuator (17), and switch (9) from housing (18).

   c. Pull wires of switch (9) through grommet (19) in shaft support plate (20).

B. **CLEANING**

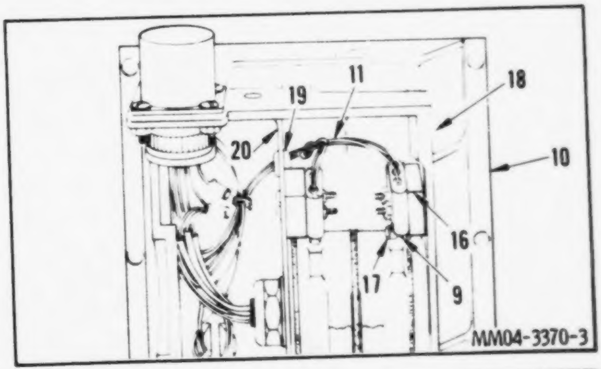
Wipe all removed and attaching parts with a clean rag.

C. **INSPECTION**

1. **Check mounting surfaces and attaching parts for cracks.** None allowed.

2. **Check wires for cuts, cracks, and damaged connectors** (TM 55-1500-323-24).

D. **INSTALLATION**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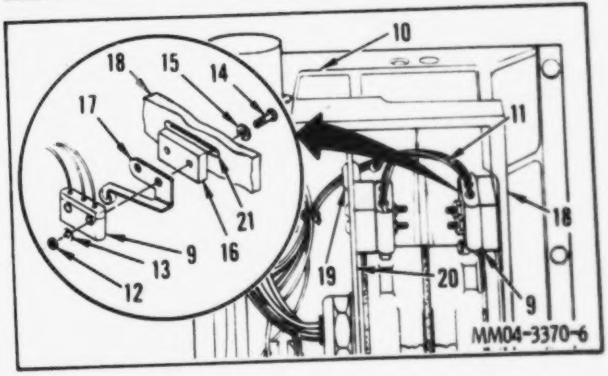
1. **Install engine No. 2 engine out disable switch (9) on CPG power quadrant (10).**

   a. Insert wires of switch (9) through grommet (19) in shaft support plate (20).

   b. Aline mounting holes of switch (9), switch actuator (17), and spacer (16) with slot (21) in shaft support plate (18).

   c. Install two screws (14), through washers (15), lock washers (13), and locknuts (12). Tighten locknuts (12) finger tight.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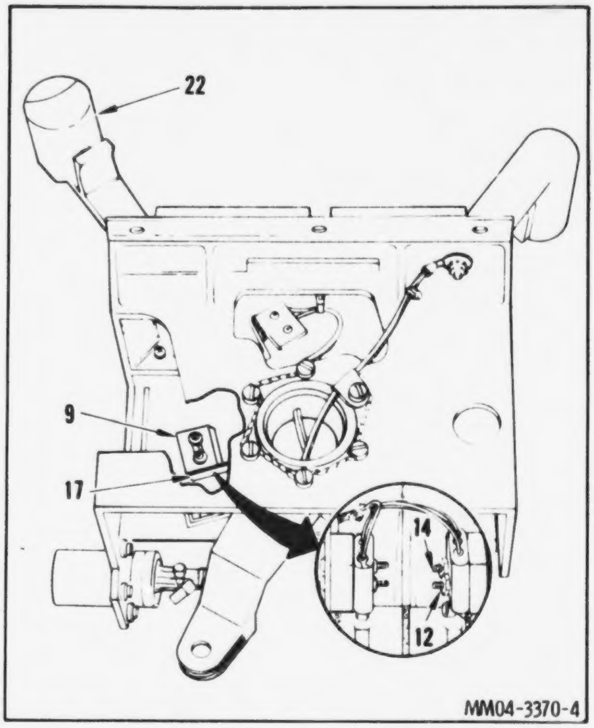
4-8-48. CPG POWER QUADRANT NO. 2 ENGINE OUT DISABLE SWITCH REMOVAL/INSTALLATION (AVIM) (cont) 4-8-48

2. **Adjust No. 2 engine control power lever (22) to actuate engine No. 2 engine out disable switch (9).** Ensure that switch actuator (17) does not overbend when power lever (22) is in FLY.

3. **Apply sealing compund to threads of two screws (14).** Tighten two locknuts (12). Use compound (E119).



MM04-3370-4

4. **Install new wire cap (5) on three wires (6), (7), and (8).**

5. **Install new wire cap (3) on wire (4).**

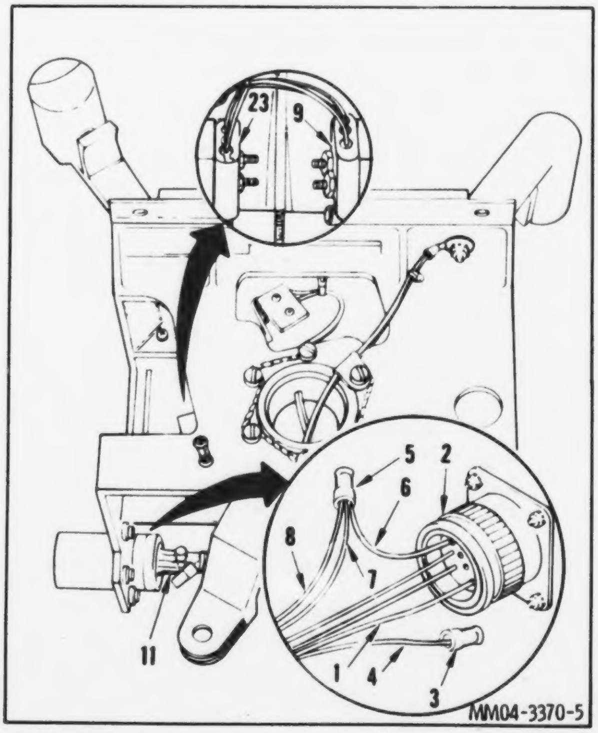
6. **Attach wire (1) to pin 3 of connector J1 (2).**

7. **Install tiewraps as required.**

8. **Inspect (TI).**

9. **Install CPG power quadrant** (para 4-8-23).

10. **Perform power plant operational check (engine 1 and engine 2)** (TM 55-1520-238-T).



MM04-3370-5

END OF TASK

4-8-49. CPG POWER QUADRANT LEVER RELEASE SWITCH REMOVAL/INSTALLATION (AVIM)

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number
Tool Kit, Electrical Repairer's	5180-00-323-4915

Materials/Parts:

	Wire Cap
(E119)	Compound, Sealing

Personnel Required

68F10	Aircraft Electrician
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T
TM 55-1520-323-24

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-8-22	CPG power quadrant removed

NOTE

This task is typical for engine No. 1 or No. 2 lever release switch.

A. REMOVAL

1. **Remove lever release switch wire (1) from connector J1 (2).**

   a. Identify wire (1).

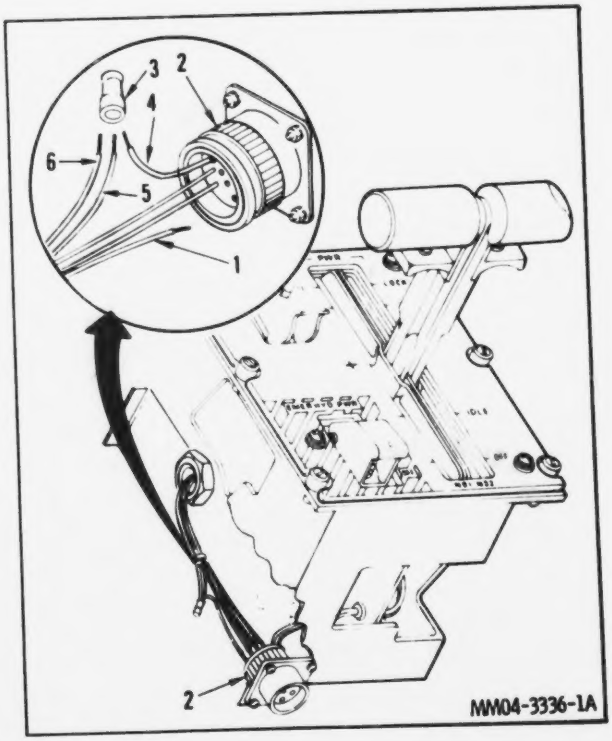
   b. For engine No. 1, depin wire (1) from pin 4 of connector J1 (2).

   c. For engine No. 2, depin wire (1) from pin 5 of connector J1 (2).

2. **Remove wire cap (3) from three lever release switch wires (4), (5), and (6).**

   a. Identify three wires (4), (5), and (6).

   b. Remove and discard wire cap (3).



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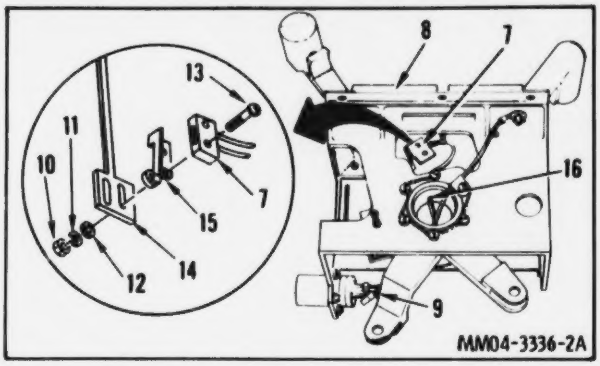
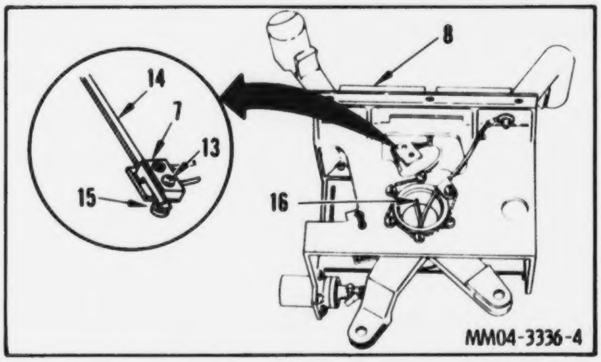
4-8-49. CPG POWER QUADRANT LEVER RELEASE SWITCH REMOVAL/INSTALLATION (AVIM) (cont) 4-8-49





3. **Remove lever release switch (7) from CPG power quadrant (8).**

   a. Remove tie-down straps attaching wires of switch (7) to wire harness (9).

   b. Remove two locknuts (10), lock washers (11), washers (12), and screws (13) from control lever recess stop bar (14), switch actuator (15), and switch (7).

   c. Remove wires of switch (7) from power lever (16). Remove switch (7) and switch actuator (15) from power quadrant (8).

B. CLEANING

Wipe all removed and attaching parts with a clean rag.

C. INSPECTION

1. **Check mounting surfaces and attaching parts for cracks. None allowed.**

2. **Check wires for cuts, cracks, and damaged connectors (TM 55-1500-323-24).**

D. INSTALLATION

1. **Install lever release switch (7) on CPG power quadrant (8).**

   a. Insert wires of switch (7) through power lever (16). Position switch actuator (15) and switch (7) on control lever recess stop bar (14).

   b. Insert two screws (13) through holes in switch (7), switch actuator (15), and control lever recess stop bar (14).

   c. Install two washers (12), lock washers (11), and locknuts (10). Tighten locknuts (10) finger tight.

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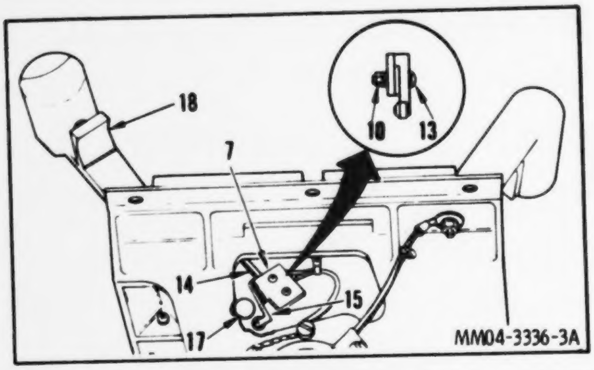
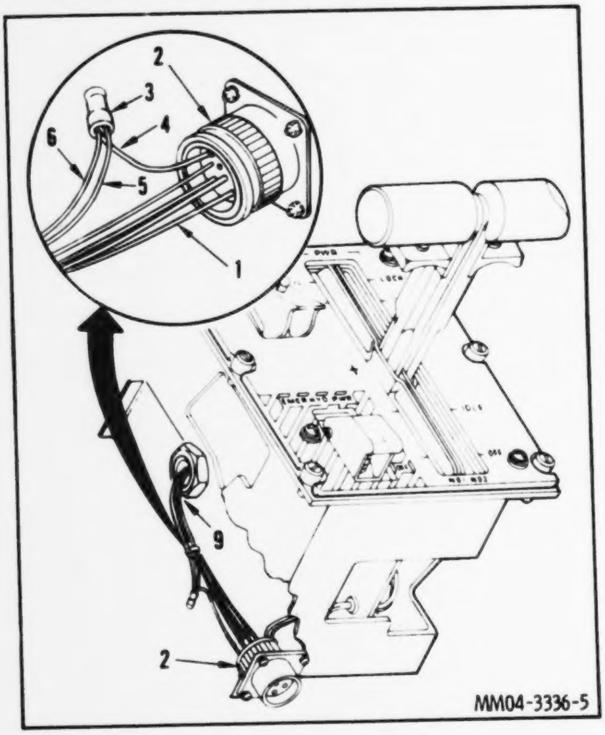
4-8-49. CPG POWER QUADRANT LEVER RELEASE SWITCH REMOVAL/INSTALLATION (AVIM) (cont)



2. Adjust lever release switch (7) on control lever recess stop bar (14) so switch actuator (15) strikes CPG power quadrant guide (17) within 1/8 to 1/4 inch upward travel of release trigger (18).

3. Apply sealing compound to threads of two screws (13) and tighten two locknuts (10). Use compound (E119).



4. Install new wire cap (3) on three wires (4), (5), and (6).

5. Attach wire (1) to connector J1 (2).

   a. For engine No. 1, attach wire (1) to pin 4 of connector J1 (2).

   b. For engine No. 2, attach wire (1) to pin 5 of connector J1 (2).

6. Install tiewraps as required.

7. Inspect (TI).

8. Install CPG power quadrant (para 4-8-23).

9. Perform power plant operational check (engine 1 and engine 2) (TM 55-1520-238-T).

END OF TASK

4-5-50. CPG BAT OVRD SWITCH REMOVAL/INSTALLATION 4-8-50

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915

Personnel Required:

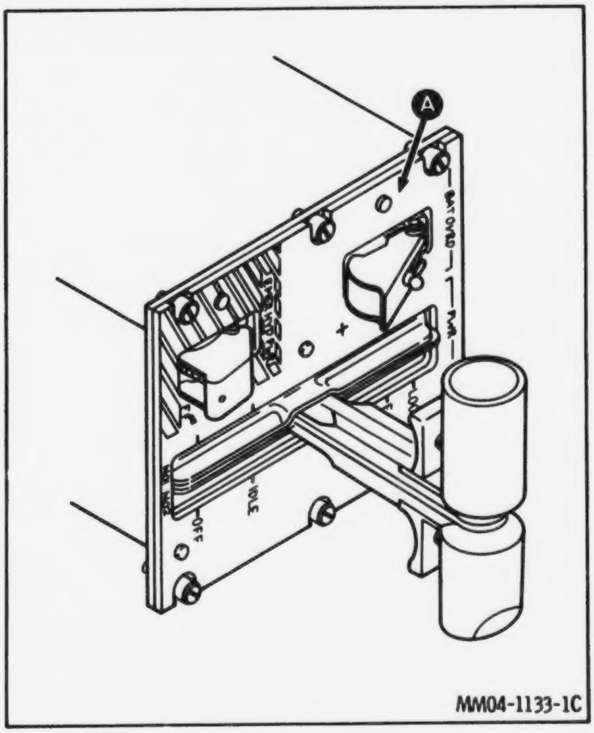
68F10	Aircraft Electrician
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T
TM 55-1500-323-24

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
4-8-22	CPG power quadrant removed



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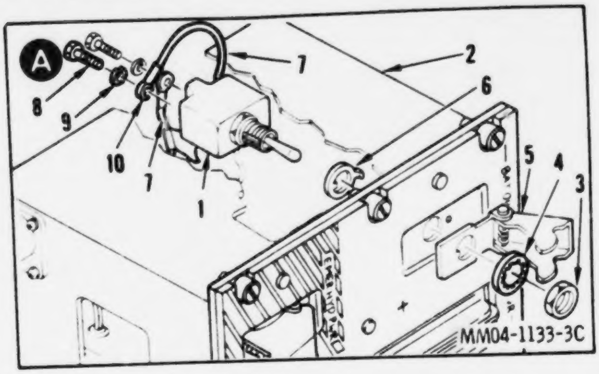
4-8-50. CPG BAT OVRD SWITCH REMOVAL/INSTALLATION (cont) 4-8-50



MM04-1133-3C

A. REMOVAL

1. **Remove CPG BAT OVRD switch (1) from CPG power quadrant (2).** Remove nut (3), lock washer (4), switch guard (5), and lockring (6).

2. **Identify and detach two wires (7) from CPG BAT OVRD switch (1).**

   a. Position switch (1) so wires (7) are accessible.

   b. Remove two screws (8), two lock washers (9), and two terminal lugs (10).

B. CLEANING

Wipe all removed and attaching parts with a clean rag.

C. INSPECTION

1. **Check mounting surfaces and attaching parts for cracks.** None allowed.

2. **Check wires for cuts, cracks, and damaged connections** (TM 55-1500-323-24).

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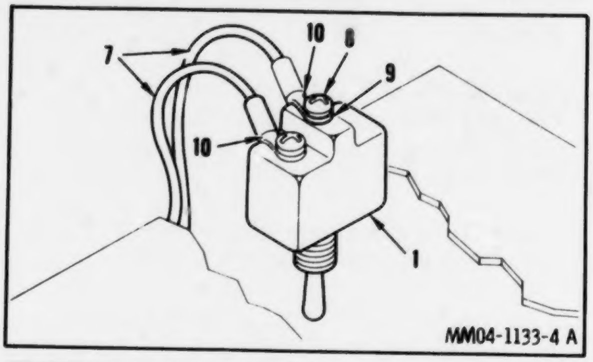
4-8-50. CPG BAT OVRD SWITCH REMOVAL/INSTALLATION (cont) 4-8-50

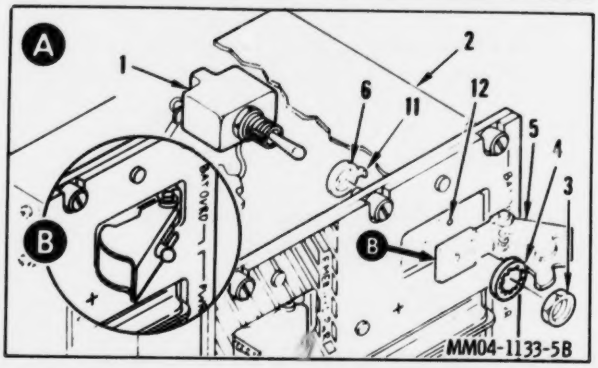
D. INSTALLATION

1. **Attach two wires (7) to CPG BAT OVRD switch (1).** Install two terminal lugs (10), lock washers (9), and screws (8).



MM04-1133-4 A

2. **Install CPG BAT OVRD switch (1) in CPG power quadrant (2).**
   a. Insert switch (1) through lockring (6) so lockring tab (11) seats in locator (12).
   b. Install switch guard (5), lock washer (4), and nut (3).
3. **Inspect (TI).**
4. **Install CPG power quadrant** (para 4-8-23).
5. **Perform battery operational check** (TM 55-1520-238-T).



MM04-1133-5B

END OF TASK

4-8-51. CPG EMER HYD PWR SWITCH REMOVAL/INSTALLATION 4-8-51

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915

Personnel Required:

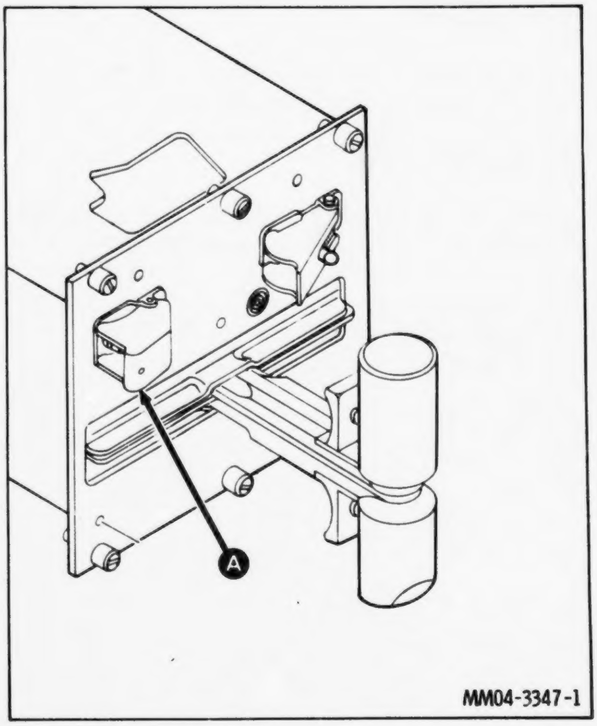
68F10	Aircraft Electrician
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T
TM 55-1500-323-24

Equipment Conditions:

Ref	Condition
4-8-22	CPG power quadrant removed
4-8-46	CPG power quadrant indicating lighted transmitting panel removed.



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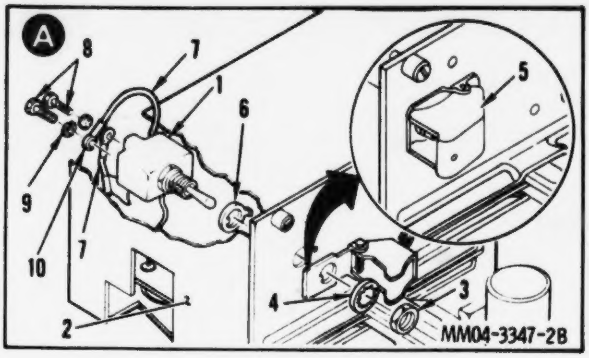
4-8-51. CPG EMER HYD PWR SWITCH REMOVAL/INSTALLATION (cont) 4-8-51

A. REMOVAL



1. **Remove switch (1) from CPG power quadrant (2).** Remove nut (3), lock washer (4), switch guard (5), and lockring (6).

2. **Identify and detach two wires (7) from EMER HYD PWR switch (1).**

   a. Position switch (1) so wires (7) are accessible.

   b. Remove two screws (8), lock washers (9), and terminal lugs (10).

B. CLEANING

Wipe all removed and attaching parts with a clean rag.

C. INSPECTION

1. **Check mounting surfaces and attaching parts for cracks.** None allowed.

2. **Check wires for cuts, cracks, and damaged connections** (TM 55-1500-323-24).

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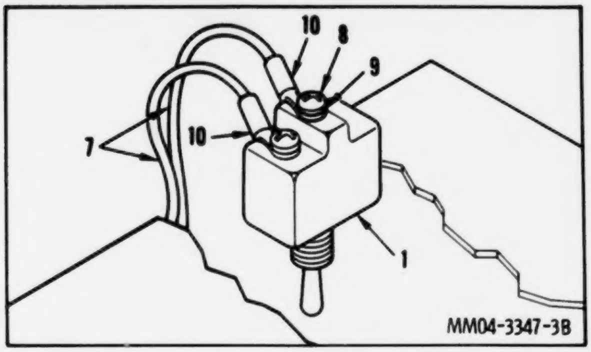
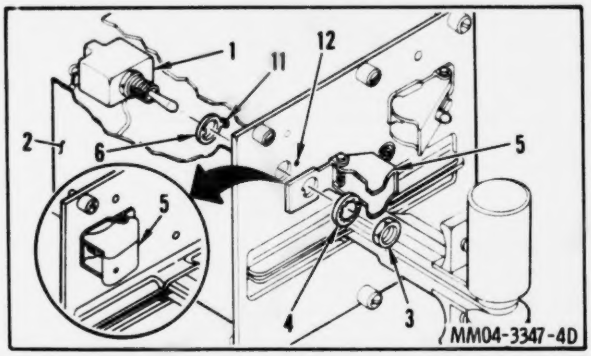
4-8-51. CPG EMER HYD PWR SWITCH REMOVAL/INSTALLATION (cont) 4-8-51

D. INSTALLATION

1. **Attach two wires (7) to EMER HYD PWR switch (1).** Install two terminal lugs (10), two lock washers (9), and two screws (8).



2. **Install EMER HYD PWR switch (1) in CPG power quadrant (2).**
   a. Insert switch (1) through lockring (6) so that lockring tab (11) seats in locator hole (12).
   b. Install switch guard (5), lock washer (4), and nut (3).



3. **Inspect (TI).**
4. **Install CPG power quadrant indicating light transmitting panel** (para 4-8-46).
5. **Install CPG power quadrant** (para 4-8-23).
6. **Perform utility hydraulic system - operational check** (TM 55-1520-238-T).

END OF TASK

4-8-52. NO. 1 AND NO. 2 ENGINE POWER CONTROL SPINDLE GEARBOX BASEPLATE REMOVAL/INSTALLATION 4-8-52

This task covers: A. REMOVAL B. CLEANING C. INPSECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque 1/4 Drive	5120-00-542-4489

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

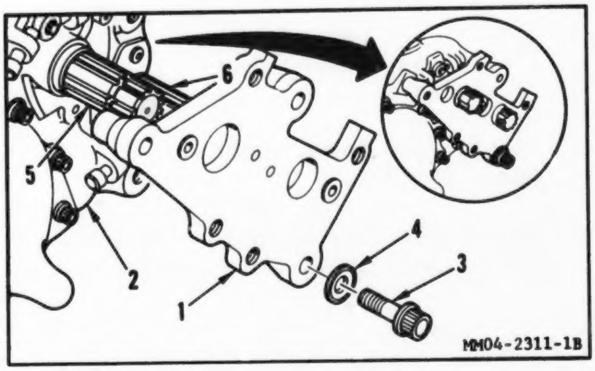
Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access door LN1 or RN 1 opened
4-8-1	No. 1 engine power available spindle gearbox removed or
4-8-2	No. 2 engine power available spindle gearbox removed
4-8-3	No. 1 engine load demand spindle gearbox removed or
4-8-4	No. 2 engine load demand spindle gearbox removed

NOTE

This task is typical for No. 1 or No. 2 engine gearbox baseplate.

A. REMOVAL

Remove baseplate (1) from hydromechanical unit (HMU) (2). Remove bolt (3) and washer (4).



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4-8-52. NO. 1 AND NO. 2 ENGINE POWER CONTROL SPINDLE GEARBOX BASEPLATE REMOVAL/INSTALLATION (cont) 4-8-52

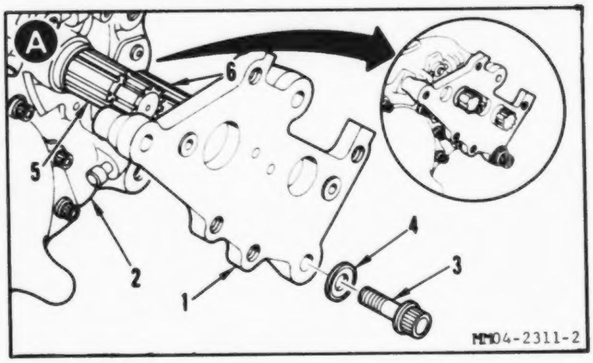
B. CLEANING

Clean exposed HMU (para 1-5-36).

C. INSPECTION

1. Check exposed HMU for bent shafts or cracked shaft splines.
   None allowed.
2. Check exposed HMU for corrosion (para 1-5-38).

D. INSTALLATION



1. Install baseplate (1) and HMU (2). Torque bolt (3) to 60 INCH-POUNDS.
   a. Aline baseplate (1) on face of HMU (2).
   b. Install bolt (3) and washer (4).
   c. Torque bolt (3) to 60 INCH-POUNDS.
2. Inspect (TI).
3. Install No. 1 or No. 2 engine power available gearbox spindle gearbox (para 4-8-1 or 4-8-2).

END OF TASK

4-8-53. COLLECTIVE ACTUATOR ENGINE CONTROL ROD REMOVAL/INSTALLATION 4-8-53

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque, 1/4 Drive	5120-00-117-4832
Aviation Ground Power Unit	1730-01-144-1897
Rigging, Kit, Control Systems	1730-01-181-9270

Materials/Parts:

	Cotter Pin (2)
(E29)	Lockwire

Personnel Required:

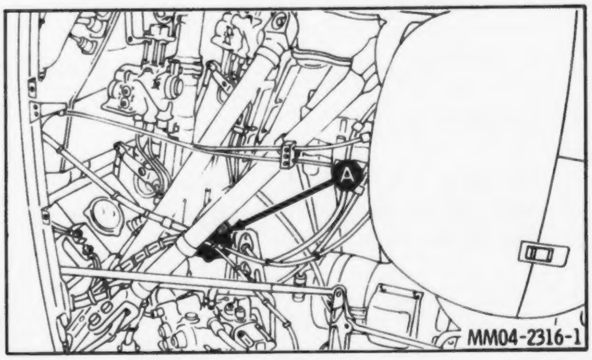
67R10	Attack Helicotper Repairer
66R30	Inspector/Supervisor

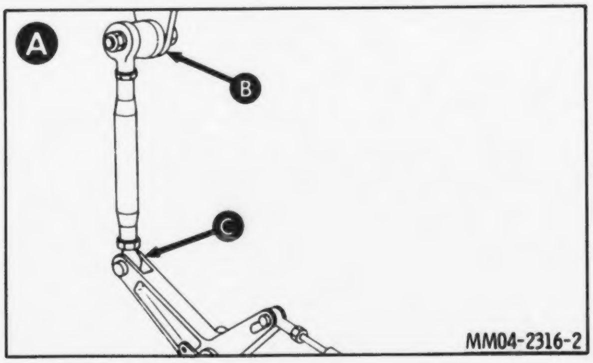
References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access panel L200 removed





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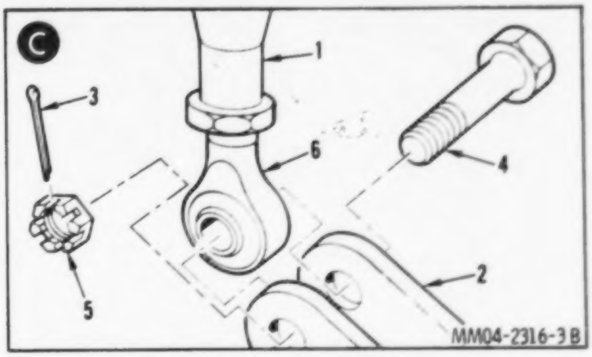
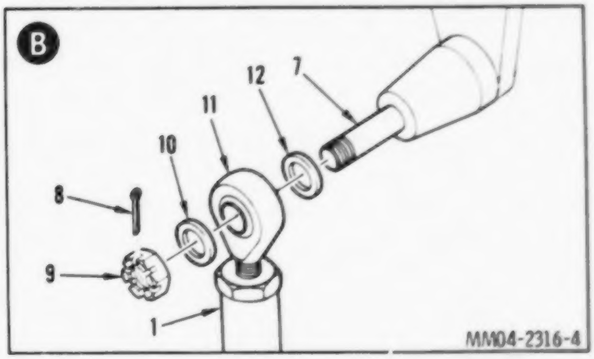
4-8-53. COLLECTIVE ACTUATOR ENGINE CONTROL ROD REMOVAL/INSTALLATION (cont) 4-8-53

A. REMOVAL

1. **Disconnect engine collective actuator rod (1) from bellcrank (2).**
   - a. Remove and discard cotter pin (3).
   - b. Hold bolt (4).
   - c. Remove nut (5).
   - d. Remove bolt (4) from bellcrank (2) and rod end (6).
2. **Remove control rod (1) from collective actuator adapter (7).**
   - a. Remove and discard cotter pin (8).
   - b. Remove nut (9) and washer (10).
   - c. Slide rod end (11) from adapter (7).
   - d. Remove washer (12).





B. CLEANING

Clean bellcrank and adapter (para 1-5-36).

C. INSPECTION

1. **Check bellcrank and adapter for cracks.** None allowed.
2. **Check adapter for damaged threads.** None allowed.
3. **Check bellcrank and adapter for corrosion** (para 1-5-38).

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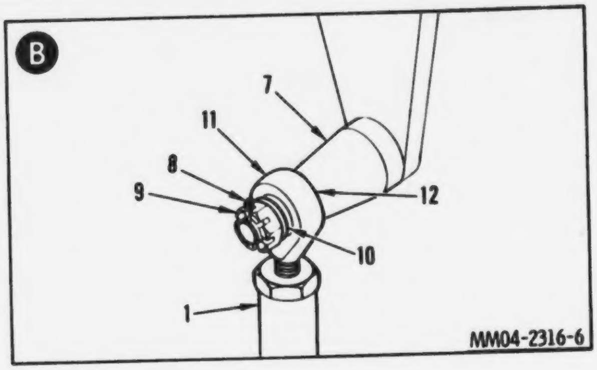
4-8-53. COLLECTIVE ACTUATOR ENGINE CONTROL ROD REMOVAL/INSTALLATION (cont) 4-8-53



D. INSTALLATION

1. **Install control rod (1) on adapter (7).**

   a. Install washer (12) on adapter (7).

   b. Slide rod end (11) on adapter (7).

   c. Install washer (10) and nut (9) on adapter (7).

2. **Torque nut (9) to 20 to 30 INCH-POUNDS and install new cotter pin (8).**

   a. Torque nut (9) to **20 INCH-POUNDS.**

   b. Increase torque to aline cotter pin hole, but do not exceed **30 INCH-POUNDS.**

   c. Install new cotter pin (8).

3. **Inspect (TI).**

NOTE

If adjustment of control rod is required, proceed to step 3. If no adjustment is necessary, go to step 4.

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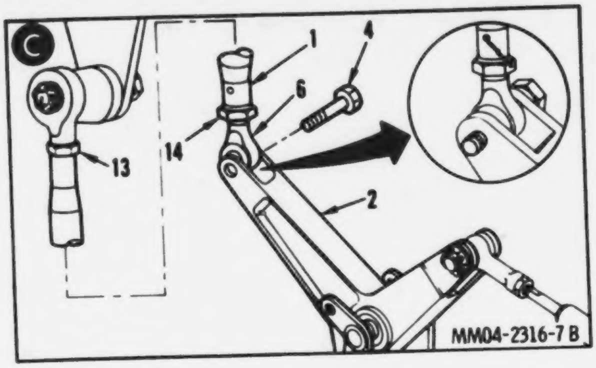
4-8-53. COLLECTIVE ACTUATOR ENGINE CONTROL ROD REMOVAL/INSTALLATION (cont) 4-8-53



4. Adjust length of control rod (1).

   a. Remove lockwire from nuts (13) and (14).

   b. Loosen nuts (13) and (14).

   c. Aline rod end (6) in bellcrank (2).

   d. Insert bolt (4) through bellcrank (2) and rod end (6).

   e. Rotate rod (1) to aline upper bellcrank (2).

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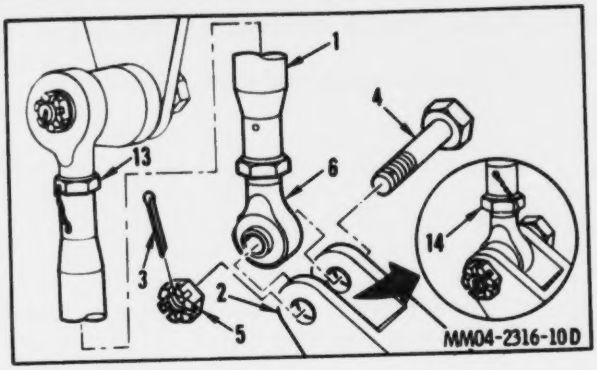
4-8-53. COLLECTIVE ACTUATOR ENGINE CONTROL ROD REMOVAL/INSTALLATION (cont) 4-8-53



5. **Connect cable rod (1) to bellcrank (2).**
   a. Hold open end of bellcrank (2) full down.
   b. Aline rod end (6) to bellcrank (2).
   c. Insert bolt (4) through bellcrank (2) and rod end (6).
   d. Check fit of self-retaining bolt (4) (para 11-2-1).
   e. Install nut (5) on bolt (4).
6. **Torque nut (5) to 14 to 18 INCH-POUNDS and install new cotter pin (3).**
   a. Hold bolt (4) and torque nut (5) to 14 INCH-POUNDS.
   b. Increase torque to aline cotter pin holes, but do not exceed 18 INCH-POUNDS.
   c. Install new cotter pin (3).
7. **Torque nuts (13) and (14) to 20 INCH-POUNDS.**
8. **Lockwire nuts (13) and (14).** Use lockwire (E29).
9. **Inspect (TI).**
10. **Perform load demand spindle rigging check** (para 4-8-34).
11. **Perform power plant operational check (engine 1 and engine 2)** (TM 55-1520-238-T).
12. **Secure access panel L200** (para 2-2-2).

END OF TASK

4-8-54. ENGINE LOAD DEMAND SPINDLE BELLCRANK REMOVAL/INSTALLATION 4-8-54

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Wrench, Torque 1/4 Drive	5120-00-542-4489
Wrench, Torque 1/4 Drive	5120-00-117-4832

Materials/Parts:

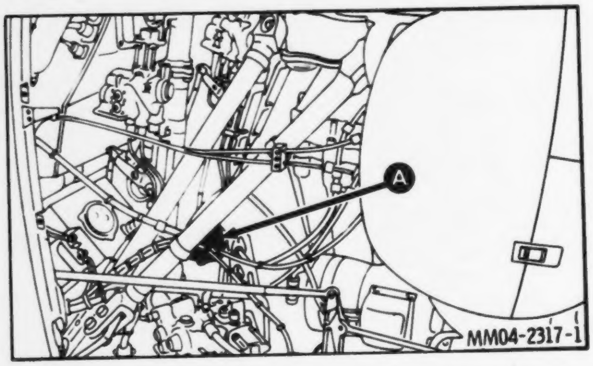
Cotter Pin (4)

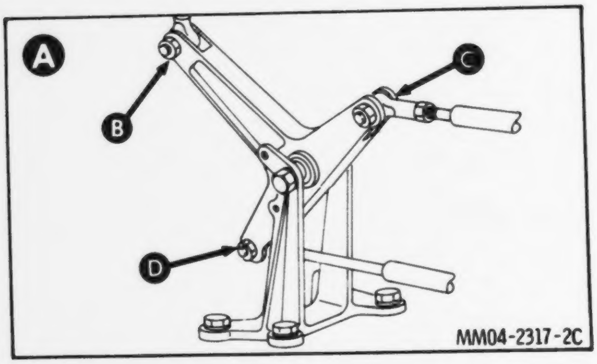
Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access panel L200 removed





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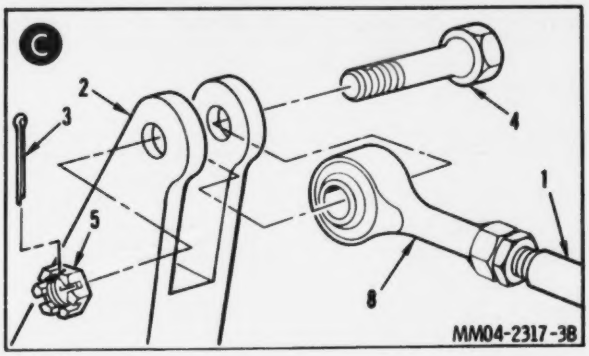
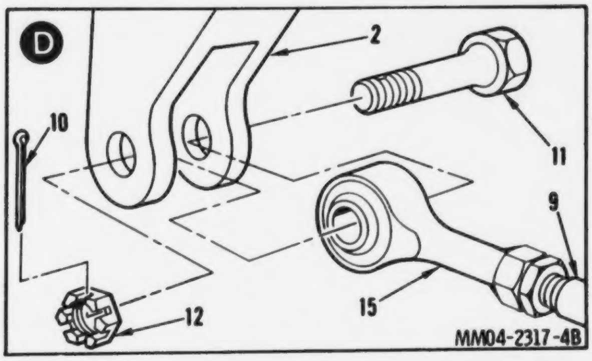
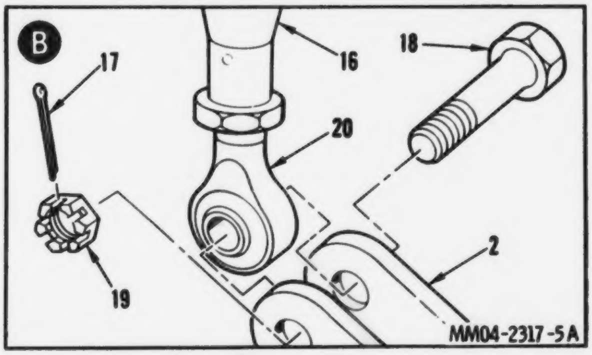
4-8-54. ENGINE LOAD DEMAND SPINDLE BELLCRANK REMOVAL/INSTALLATION (cont) 4-8-54

A. REMOVAL

1. **Disconnect No. 1 engine load demand spindle (LDS) forward cable (1) from load demand spindle bellcrank (2).**
   - a. Remove and discard cotter pin (3).
   - b. Hold bolt (4).
   - c. Remove nut (5).
   - d. Remove bolt (4) from bellcrank (2) and rod end.
2. **Disconnect No. 2 engine LDS forward cable (9) from bellcrank (2).**
   - a. Remove and discard cotter cotter pin (10).
   - b. Hold bolt (11).
   - c. Remove nut (12).
   - d. Remove bolt (11) from bellcrank (2) and rod end (15).
3. **Disconnect collective actuator control rod (16) from bellcrank (2).**
   - a. Remove and discard cotter pin (17).
   - b. Hold bolt (18).
   - c. Remove nut (19).
   - d. Remove bolt (18) from bellcrank (2) and rod end (20).







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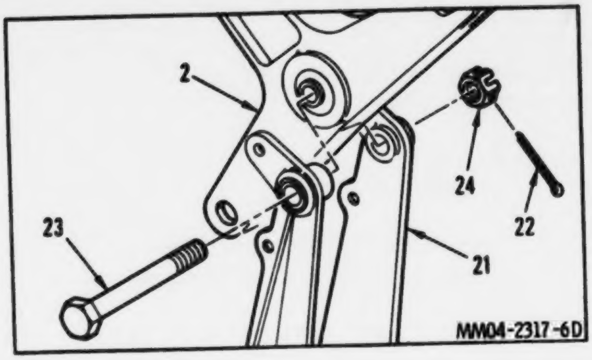
4-8-54. ENGINE LOAD DEMAND SPINDLE BELLCRANK REMOVAL/INSTALLATION (cont) 4-8-54



4. **Remove bellcrank (2) from support (21).**
   a. Remove and discard cotter pin (22).
   b. Hold bolt (23).
   c. Remove nut (24).
   d. Remove bolt (23) from support (21) and bellcrank (2).

B. **CLEANING**

Clean support (para 1-5-36).

C. **INSPECTION**

1. **Check support for cracks.** None allowed.
2. **Check support for corrosion** (para 1-5-38).

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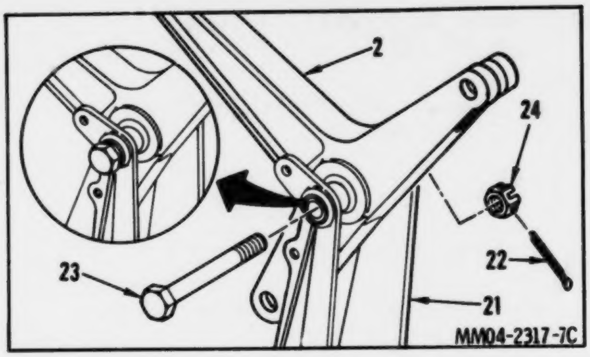
4-8-54. ENGINE LOAD DEMAND SPINDLE BELLCRANK REMOVAL/INSTALLATION (cont) 4-8-54

D. INSTALLATION



MM04-2317-7C

1. **Install bellcrank (2) on support (21).**
    a. Aline bellcrank (2) in support (21).
    b. Insert bolt (23) through support (21) and bellcrank (2).
    c. Install nut (24) on bolt (25).
2. **Torque nut (24) to 65 to 80 INCH-POUNDS and install new cotter pin (22).**
    a. Hold bolt (23). Torque nut (24) to 65 **INCH-POUNDS.** Use 1/4 drive torque wrench (30-150 inch-pounds).
    b. Increase torque to aline cotter pin hole but do not exceed 80 **INCH-POUNDS.**
    c. Install new cotter pin (22).

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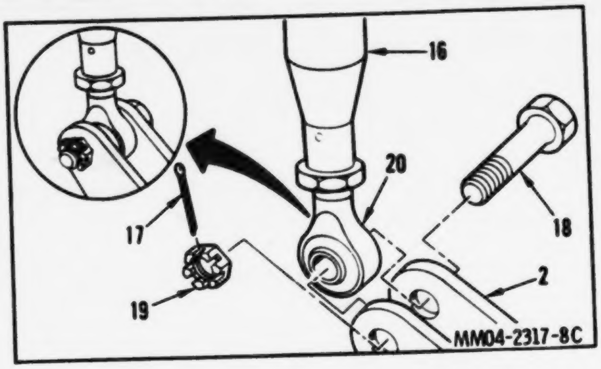
4-8-54. ENGINE LOAD DEMAND SPINDLE BELLCRANK REMOVAL/INSTALLATION (cont) 4-8-54



3. **Connect control rod (16) to bellcrank (2).**

   a. Aline rod end (20) in bellcrank (2).

   b. Insert bolt (18) through bellcrank (2) and rod end (20).

   c. Install nut (19) on bolt (18).

4. **Torque nut (19) 14 to 18 INCH-POUNDS and install new cotter pin (17).**

   a. Hold bolt (18) and torque nut (19) to 14 **INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 inch-pounds).

   b. Increase torque to aline cotter pin holes but do not exceed 18 **INCH-POUNDS.**

   c. Install new cotter pin (17).

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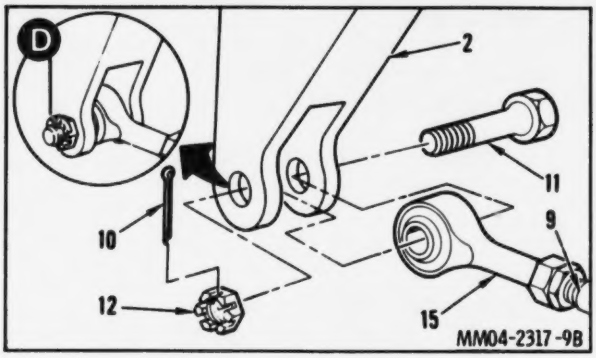
4-8-54. ENGINE LOAD DEMAND SPINDLE BELLCRANK REMOVAL/INSTALLATION (cont) 4-8-54



5. **Connect cable (9) to bellcrank (2).**

   a. Aline rod end (15) in bellcrank (2).

   b. Insert bolt (11) through bellcrank (2) and rod end (15).

   c. Install nut (12) on bolt (11).

6. **Torque nut (12) 14 to 18 INCH-POUNDS and install new cotter pin (10).**

   a. Hold bolt (11) and torque nut (12) to **14 INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 inch-pounds).

   b. Increase torque to aline cotter pin hole but do not exceed **18 INCH-POUNDS.**

   c. Install new cotter pin (10).

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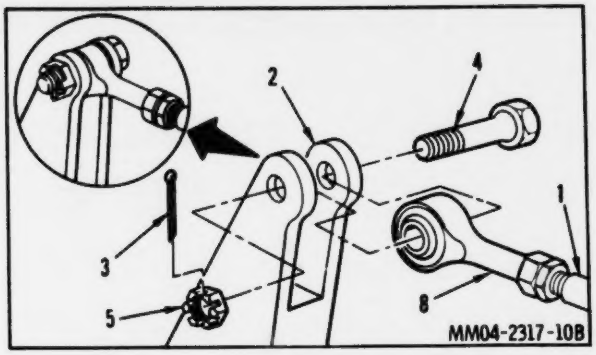
4-8-54. ENGINE LOAD DEMAND SPINDLE BELLCRANK REMOVAL/INSTALLATION (cont) 4-8-54



7. **Connect cable (1) to bellcrank (2).**
   - a. Aline rod end (8) in bellcrank bellcrank (2).
   - b. Insert bolt (4) through bellcrank (2) and rod end (8).
   - c. Install nut (5) on bolt (4).
8. **Torque nut (5) 14 to 18 INCH-POUNDS and install new cotter pin (3).**
   - a. Hold bolt (4) and torque nut (5) to 14 **INCH-POUNDS.** Use 1/4 drive torque wrench (0-30 inch-pounds).
   - b. Increase torque to aline cotter pin hole but do not exceed 18 **INCH-POUNDS.**
   - c. Install new cotter pin (3).
9. **Inspect (TI).**
10. **Perform engine power available spindle rigging check (para 4-8-33).**
11. **Perform power plant operational check (engine 1 and engine 2) (TM 55-1520-238-T).**
12. **Secure access panel L200 (para 2-2-2).**

END OF TASK

4-8-55. ENGINE LOAD DEMAND SPINDLE BELLCRANK SUPPORT REMOVAL/INSTALLATION 4-8-55

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

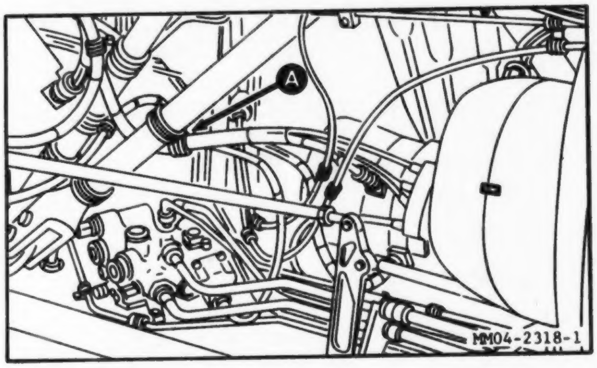
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access panel L200 removed
4-8-54	Engine load demand spindle bellcrank removed



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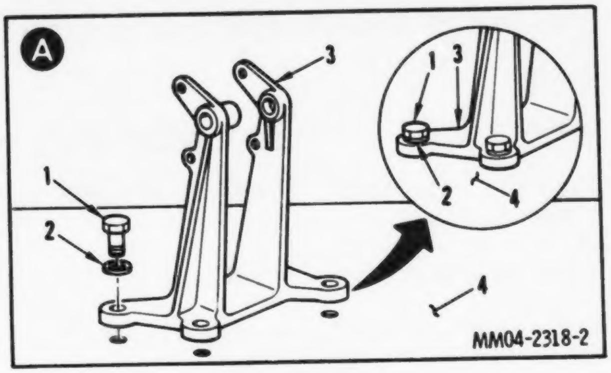
4-8-55. ENGINE LOAD DEMAND SPINDLE BELLCRANK SUPPORT REMOVAL/INSTALLATION (cont) 4-8-55



A. REMOVAL

1. Remove four bolts (1) and four washers (2) from support (3) and transmission deck (4).

2. Lift support (3) from deck (4).

B. CLEANING

Clean support mounting area on deck (para 1-5-36).

D. INSPECTION

1. Check support mounting area on deck for cracks. None allowed.

2. Check deck for corrosion (para 1-5-38).

D. INSTALLATION

1. Aline support (3) on deck (4).

2. Install four bolts (1) with four washers (2) through support (3) and deck (4).

3. Inspect (TI).

4. Install engine load demand spindle bellcrank (para 4-8-54).

5. Secure access panel L200 (para 2-2-2).

END OF TASK

4-8-56. NO. 1 ENGINE POWER CONTROL GEARBOX AFT CABLE SUPPORT REMOVAL/INSTALLATION 4-8-56

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

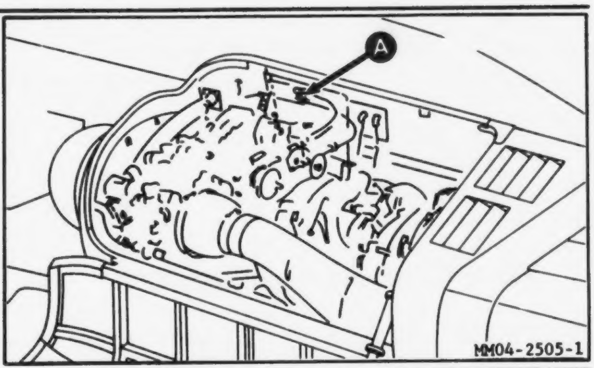
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door LN1 opened



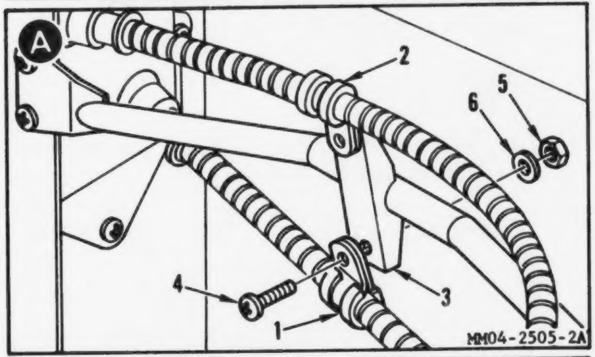
A. REMOVAL

1. **Remove clamps (1) and (2) from aft cable support (3).**

   a. Hold two screws (4).

   b. Remove two nuts (5) and two washers (6).

   c. Remove two screws (4).

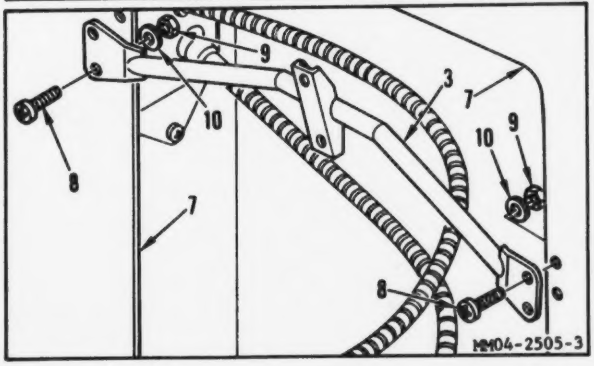


2. **Remove support (3) from firewall (7).**

   a. Hold four screws (8).

   b. Remove four nuts (9) and four washers (10).

   c. Remove four screws (8).



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4-8-56. NO. 1 ENGINE POWER CONTROL GEARBOX AFT CABLE SUPPORT REMOVAL/INSTALLATION (cont) 4-8-56

B. CLEANING

Clean support mounting area on firewall (para 1-5-36).

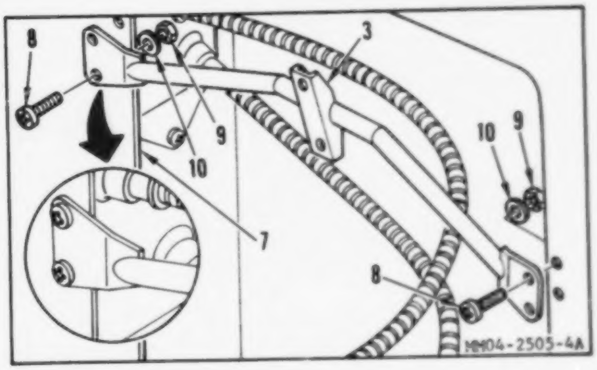
C. INSPECTION

1. Check firewall for cracks. None allowed.

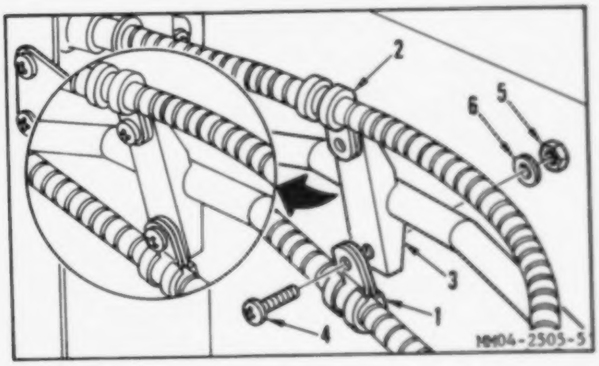
2. Check firewall for corrosion (para 1-5-38).

D. INSTALLATION

1. Install support (3) on firewall (7).
    a. Aline support (3) on firewall (7).
    b. Insert four screws (8) through support (3) and firewall (7).
    c. Install four washers (10) and nuts (9) on four screws (8).



2. Install clamps (1) and (2) on support (3).
    a. Aline clamps (1) and (2) on support (3).
    b. Insert two screws (4) through clamps (1) and (2) and support (3).
    c. Install two washers (6), nuts (5), and screws (4).



3. Inspect (TI).

4. Secure engine work platform door LN1 (para 2-2-2).

END OF TASK

4-8-57. NO. 1 AND NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE SUPPORT REMOVAL/INSTALLATION

This task covers: A. REMOVAL B. CLEANING C. INSPECTION D. INSTALLATION

Tools:

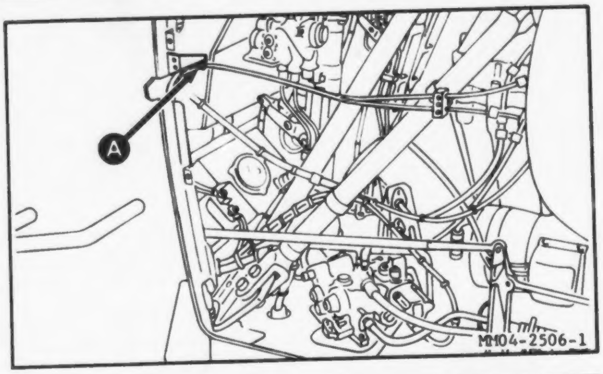
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Engine work platform door L200 removed

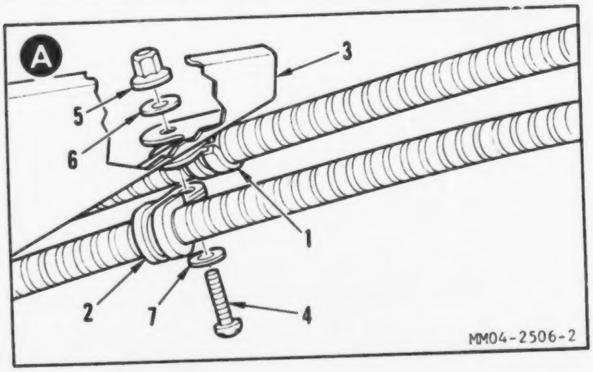
Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor



A. REMOVAL

1. **Remove clamps (1) and (2) from center cable support (3).**
   - a. Hold screw (4). Remove nut (5) and washer (6).
   - b. Remove screw (4) and washer (7).



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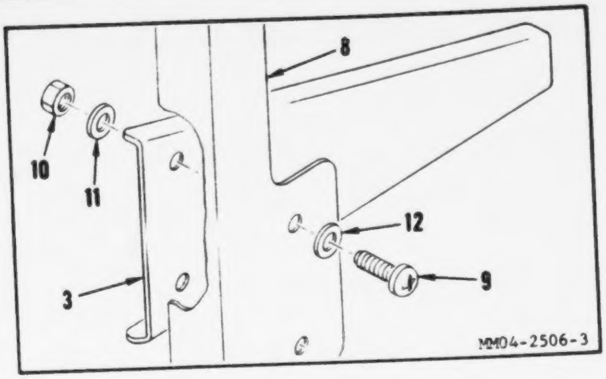
4-8-57. NO. 1 AND NO. 2 ENGINE POWER AVAILABLE SPINDLE CENTER CABLE SUPPORT REMOVAL/INSTALLATION (cont)

2. **Remove support (3) from frame (8).**

   a. Hold two screws (9). Remove two nuts (10) and washers (11).

   b. Remove two screws (9) and washers (12).



B. CLEANING

Clean support mounting area on frame (para 1-5-34).

C. INSPECTION

1. **Check support mounting area on frame for cracks.** None allowed.

2. **Check frame for corrosion** (para 1-5-36).

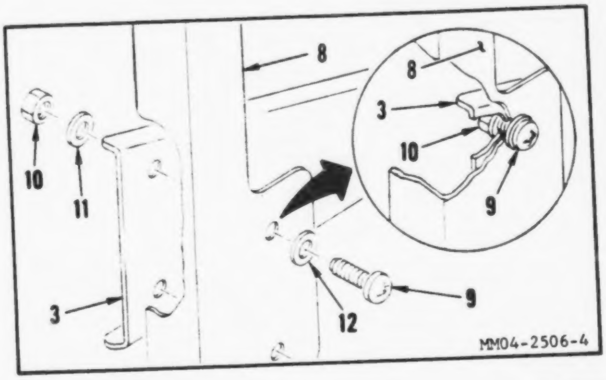
D. INSTALLATION

1. **Install support (3) on frame (8).**

   a. Aline support (3) on frame (8).

   b. Insert two screws (9) with two washers (12) through support (3) and frame (8).

   c. Install two washers (11) and nuts (10) on two screws (9).

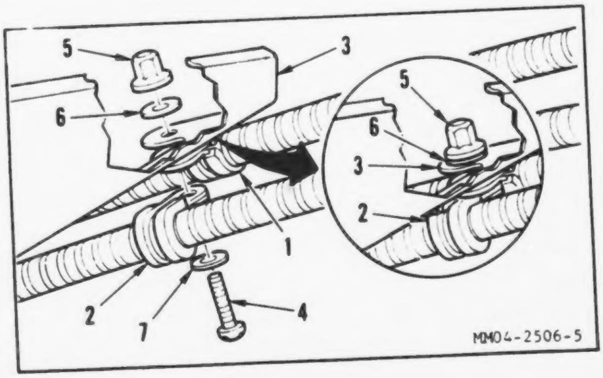


2. **Install clamps (1) and (2) on support (3).**

   a. Aline clamps (1) and (2) under support (3).

   b. Insert screw (4) through washer (7) clamps (1) and (2), and support (3).

   c. Install washer (6) and nut (5) on screw (4).



3. **Inspect (TI).**

4. **Secure engine work platform door L200** (para 2-2-1).

END OF TASK

4-8-58. PILOT COLLECTIVE CONTROL VARIABLE RESISTOR REMOVAL 4-8-58

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

Nomenclature	Part Number
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

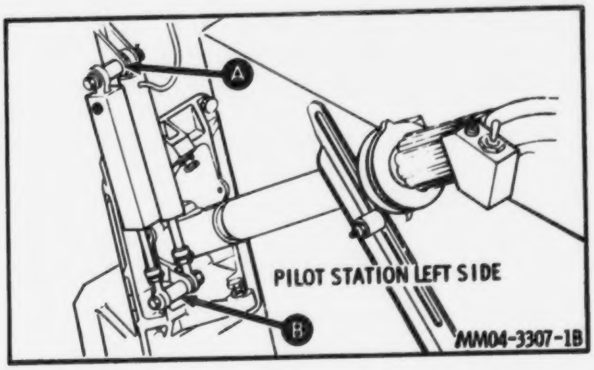
Personnel Required:

67R10 Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
11-3-51	Pilot collective stick cover removed
2-3-13	Pilot seat removed

1. Enter pilot station (para 1-7-1). Observe all safety precautions.
2. Open DASE AC, DC, and BUCS circuit breakers on pilot center circuit breaker panel.



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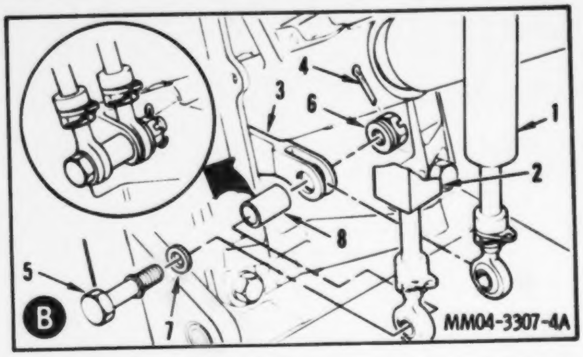
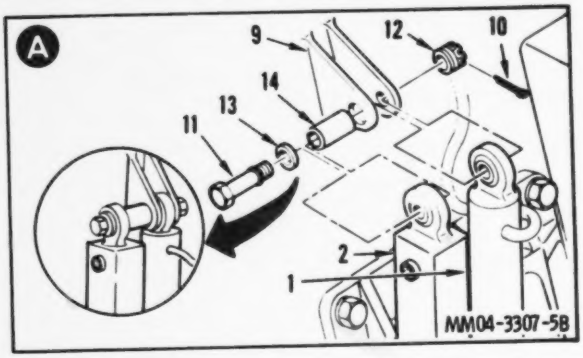
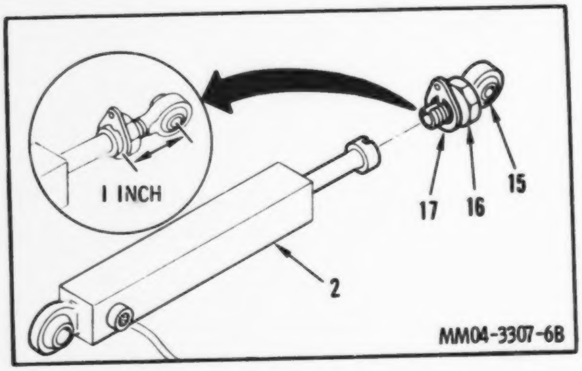
4-8-58. PILOT COLLECTIVE CONTROL VARIABLE RESISTOR REMOVAL (cont) 4-8-58



3. **Disconnect LVDT (1) and variable resistor (2) from arm (3).**
   - a. Remove cotter pin (4).
   - b. Hold bolt (5). Remove nut (6).
   - c. Remove bolt (5), washer (7), and spacer (8).



4. **Remove LVDT (1) and variable resistor (2) from bracket (9).**
   - a. Remove cotter pin (10).
   - b. Hold bolt (11). Remove nut (12).
   - c. Remove bolt (11), washer (13), and spacer (14).



5. **Remove end bearing (15) from variable resistor (2).**
   - a. Remove lockwire from nut (16) and lock washer (17).
   - b. Loosen nut (16).
   - c. Unscrew rod end bearing (15) from LVDT (1).
   - d. Retain lock washer (17) with rod end bearing (15).

B. CLEANING

Wipe all removed and attaching parts with clean rag.

C. INSPECTION

Check LVDT, resistor, and brackets for:

a. Cracks. None allowed.

b. Corrosion (para 1-5-38).

END OF TASK

4-8-59. PILOT COLLECTIVE CONTROL VARIABLE RESISTOR INSTALLATION 4-8-59

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Materials/Parts:

Cotter Pin
(E34) Lockwire

Personnel Required:

67R10 Attack Helicopter Repairer
66R30 Inspector/Supervisor

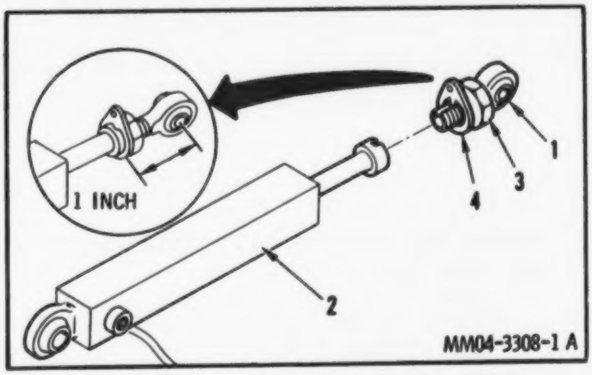
References:

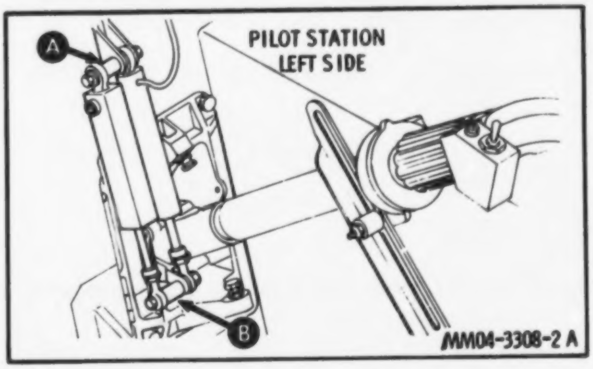
TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

1. **Attach rod end bearing (1) to variable resistor (2).**
   a. Screw bearing (1) with nut (3) and lock washer (4) into resistor (2).
   b. Adjust rod-end bearing (1) to 1-inch between center of hole in bearing and lock washer (4).
   c. Tighten nut (3).
2. **Enter pilot station** (para 1-7-1). **Observe all safety precautions.**





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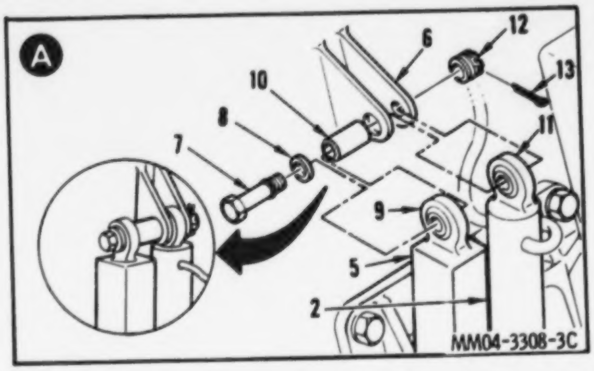
4-8-59. PILOT COLLECTIVE CONTROL VARIABLE RESISTOR INSTALLATION (cont) 4-8-59

3. **Attach LVDT (2) and variable resistor (5) to bracket (6).**

   a. Aline LVDT (2) and resistor (5) with bracket (6).

   b. Insert bolt (7) through washer (8), rod end bearing (9), spacer (10), bracket (6), and rod end bearing (11).

   c. Hold bolt (7). Install nut (12).



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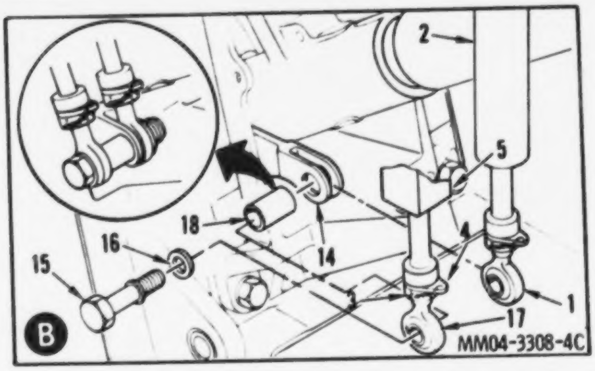
4. **Attach LVDT (2) and variable resistor (5) to arm (14).**

   a. Aline LVDT (2) and resistor (5) with arm (14).

   b. Insert bolt (15) through washer (16), rod end bearing (17), spacer (18), arm (14), and rod end bearing (1).



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5. **Check LVDT (2) nut** (para 11-4-36).

6. **Perform variable resistor adjustment** (para 4-8-60).

7. **Perform flight control system operational check** (TM 55-1520-238-T).

END OF TASK

4-8-60. PILOT VARIABLE RESISTOR ADJUSTMENT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Materials/Parts:

	Cotter Pin
(E34)	Lockwire

Personnel Required:

67R10	Attack Helicopter Repairer (2) One to assist
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
11-3-51	Pilot's collective stick cover removed
2-2-2	Access panels LN4 and RN4 opened
11-6-2	Collective rig pin installed at mid-position

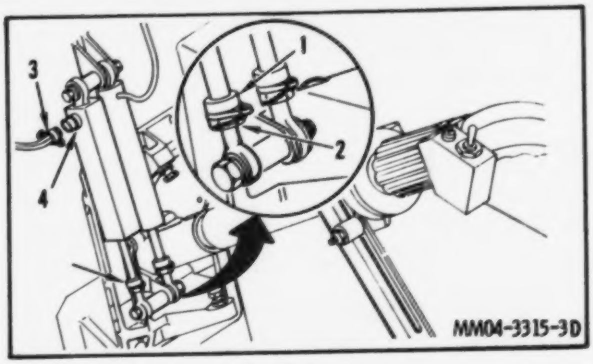
1. **Remove lockwire from rod end locknut (1).**

CAUTION

During adjustments of rod end locknut, restrain rod end to prevent damage to bearing race.

2. **To free locking washer (2), loosen rod end locknut (1).**

3. **Attach potentiometer cable connector P1121 (3) to potentiometer connector A656 J1 (4).**



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4-8-60. PILOT VARIABLE RESISTOR ADJUSTMENT (cont)

4. Detach connector P41 (5) from No. 1 engine ECU connector E1 (6).

5. Detach connector P42 (7) from No. 2 engine ECU connector E1 (8).

6. Set multimeter to 20K OHMS.

7. Record resistance between pins 4 and 13 at P41 (5).

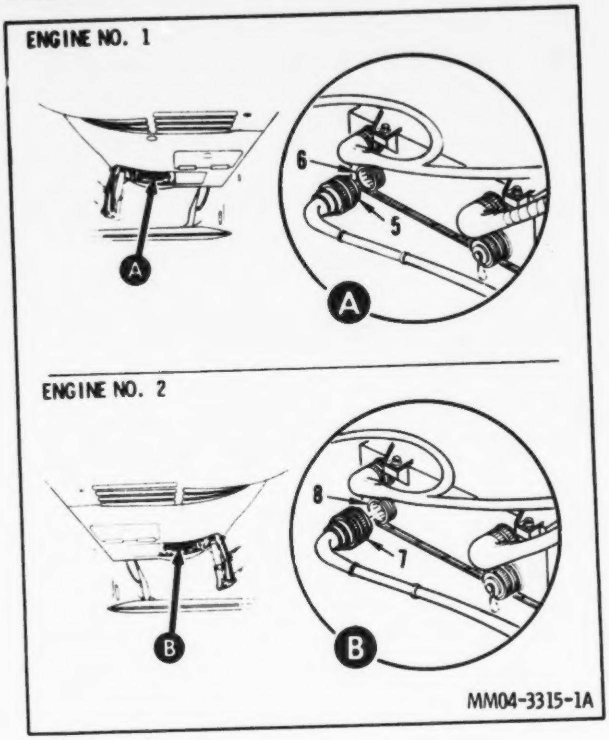
8. Record resistance between pins 4 and 13 at P42 (7).

9. To find peak resistance: add step 7 and step 8 resistances and divide by two.

NOTE

Peak resistance should be between 8.2K and 9.1K OHMS. If peak resistance is not in this range, go to steps 10 and 11. If peak resistance was in limits, go to step 12.

10. Remove bolt (9) from rod end bearing (10). Reinsert bolt through washer (11), spacer (12), arm (13), and rod end (14).



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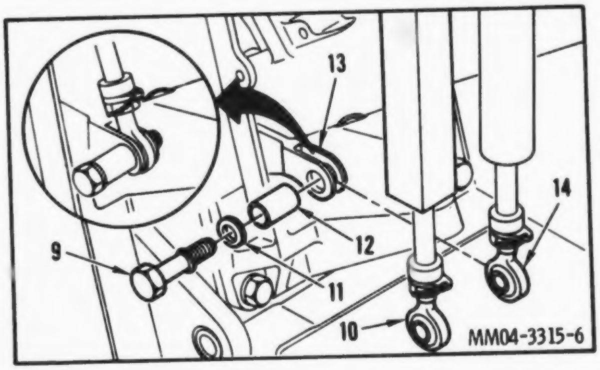

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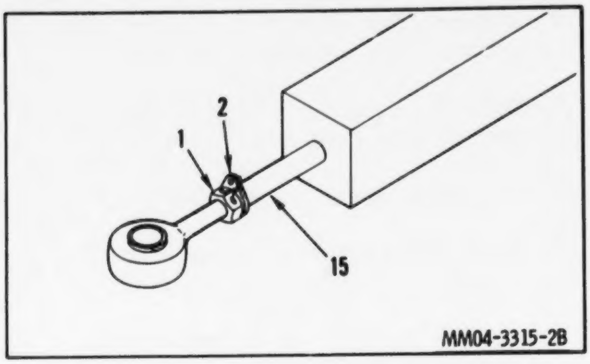
4-8-60. PILOT VARIABLE RESISTOR ADJUSTMENT (cont) 4-8-60



11. Repeat steps 8 and 9 while observing the multimeter and adjusting the potentiometer shaft (15) length to obtain a peak resistance between 8.2K OHMS and 9.1K OHMS.

12. Secure rod end locknut (1) being careful not to disturb the shaft (15) adjustment.

13. Verify the peak resistance value found in step 10 is maintained ± 25 OHMS.

14. Lockwire locknut (1) to locking washer (2). Use (E34) lockwire.

15. Secure potentiometer (4).

    a. Remove bolt (9) and reinstall through washer (11), rod end bearing (10), spacer (12), arm (13), and rod end bearing (14).

    b. Hold bolt (9). Install nut (16).

    c. Install new cotter pin (17).

16. Detach potentiometer cable connector P1121 (3) from potentiometer connector A656 J1.

17. Attach connector P41 (5) at No. 1 engine ECU connector E1 (6).

18. Attach connector P42 (7) at No. 2 engine ECU connector E1 (8).

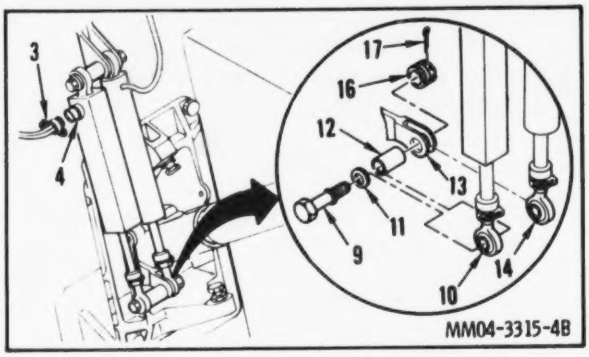
19. Inspect (TI).

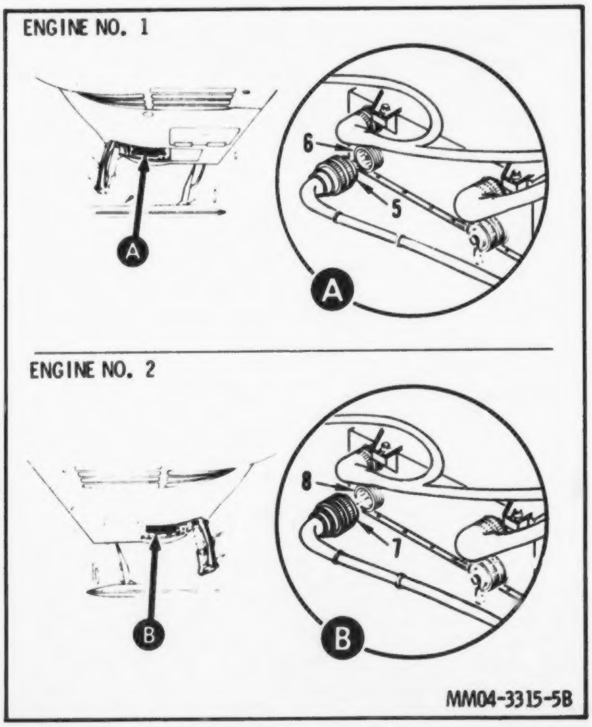
20. Remove pilot collective -3 rig pin (para 11-6-2).

21. Install pilot collective stick cover (para 11-3-51).

22. Close access panels LN4 and RN4 (para 2-2-2).

END OF TASK





CHAPTER 5

ROTORS

CHAPTER OVERVIEW

This chapter contains description and operation information and maintenance instructions for the main and tail rotors.

Rotor troubleshooting information is in TM 55-1520-238-T.

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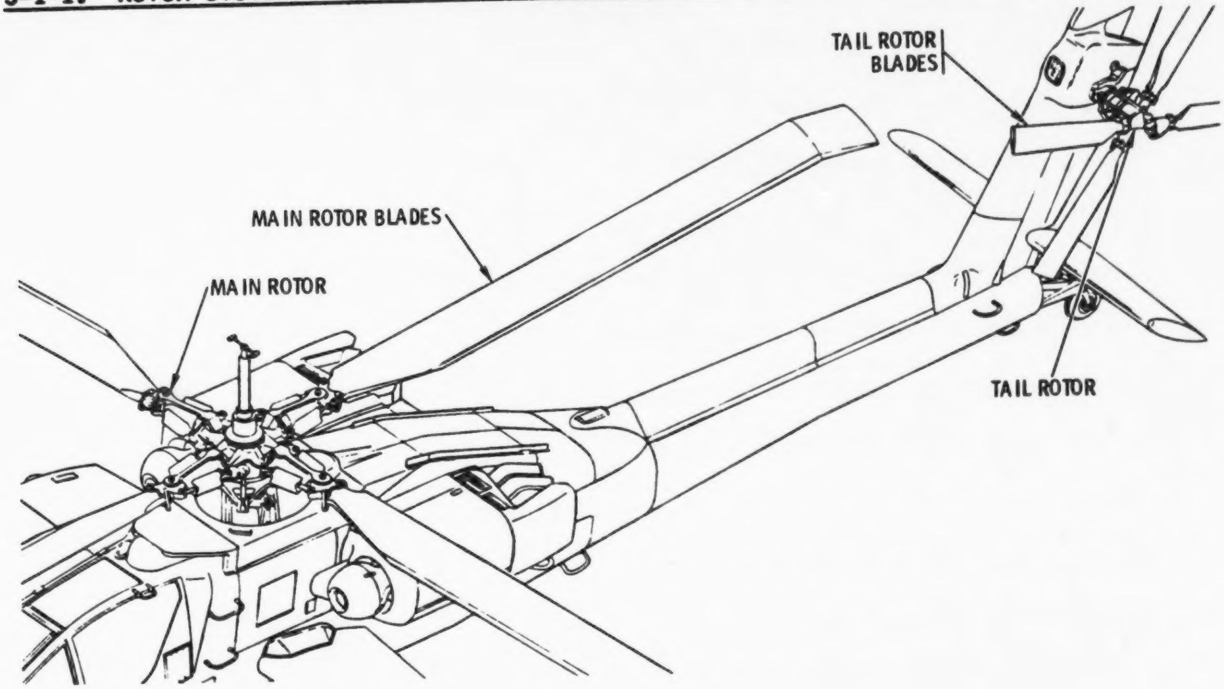
Section I. ROTOR SYSTEM DESCRIPTION AND OPERATION

5-1-1. ROTOR SYSTEM DESCRIPTION AND OPERATION 5-1-1



A. The rotor system provides lift and directional control.

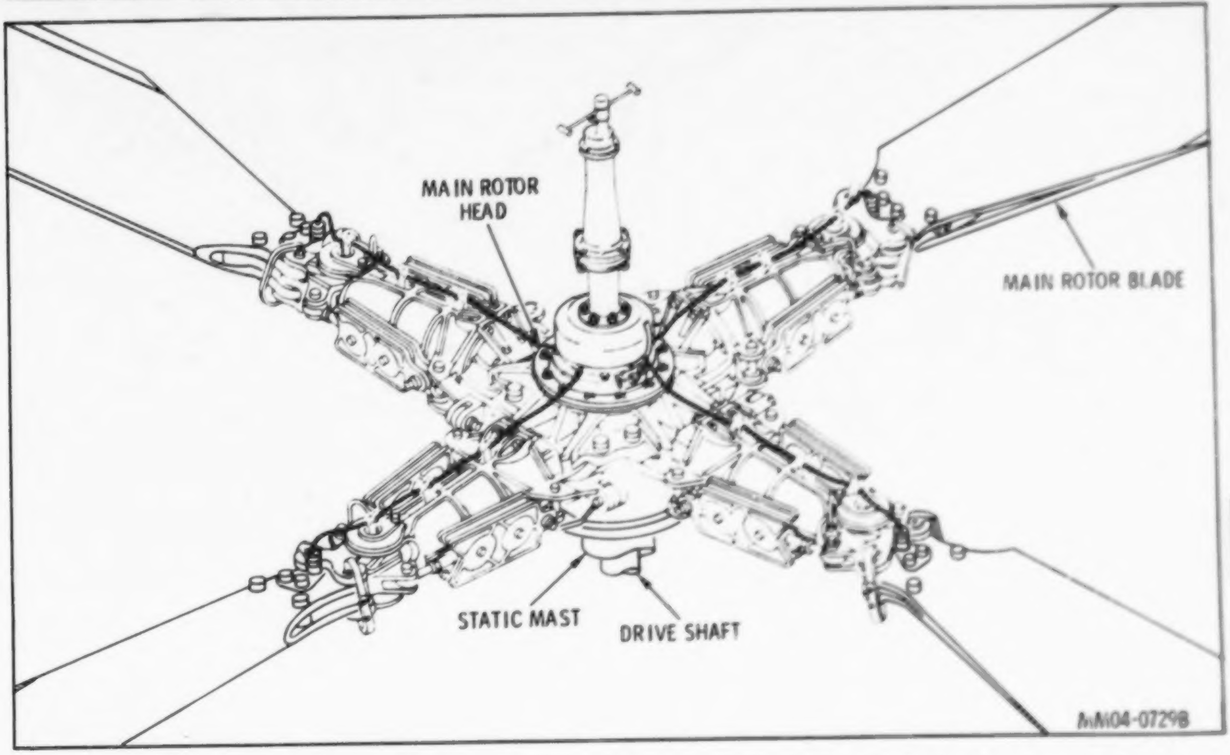
B. The major components of the rotor system are the main rotor and the tail rotor. Each has four blades.

C. The main rotor system is controlled by the collective and cyclic control sticks at the pilot and CPG stations. The tail rotor is controlled by the directional control pedals. Refer to chapter 11 for controls information.

D. Anti-icing provisions are installed on the main and tail rotor blades to prevent formation of ice in cold weather.

E. The air data sensor (ADS) is mounted on top of the static mast. The ADS provides airspeed information to the on-board helicopter computer. Refer to TM 9-1230-476-23 for ADS information.

5-1-2. MAIN ROTOR DESCRIPTION AND OPERATION 5-1-2


MAIN ROTOR HEAD
MAIN ROTOR BLADE
STATIC MAST
DRIVE SHAFT
MM04-0729B

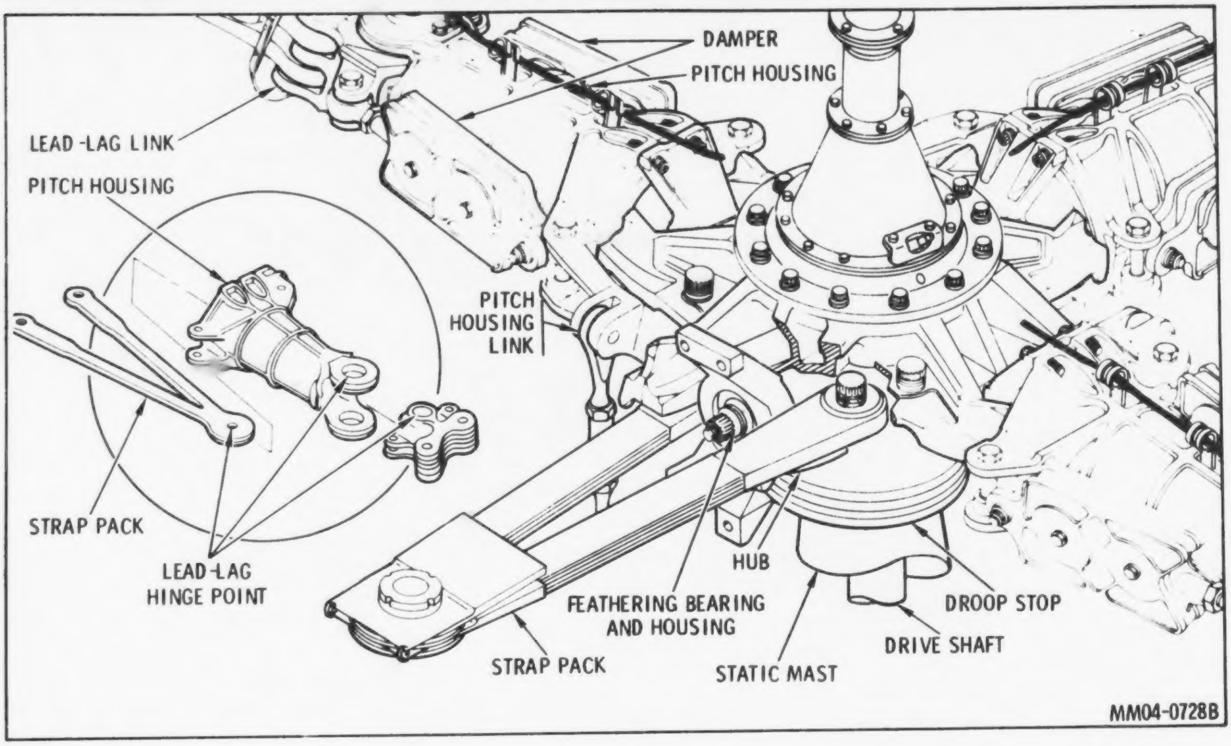
A. The main rotor provides lift and directional control for vertical, forward, rearward, and sideward movement of the helicopter.

B. The main rotor is installed on the main rotor static mast.

C. The main rotor is turned by the main rotor drive shaft in the static mast. The drive shaft is turned by the main transmission. Refer to chapter 6 for drive system information.

D. Major components of the main rotor are the main rotor head and four rotor blades.

5-1-3. MAIN ROTOR HEAD DESCRIPTION AND OPERATION 5-1-3


DAMPER
PITCH HOUSING
LEAD-LAG LINK
PITCH HOUSING
PITCH HOUSING LINK
STRAP PACK
LEAD-LAG HINGE POINT
HUB
FEATHERING BEARING AND HOUSING
DROOP STOP
DRIVE SHAFT
STRAP PACK
STATIC MAST
MM04-0728B

A. The main rotor head has the following major parts:

Hub with lower shoe	Lead-lag links	Dampers
Strap packs	Pitch housings	

B. The hub with lower shoe is mounted on the static mast. The drive shaft in the static mast transfers rotating force to the main rotor head and blades.

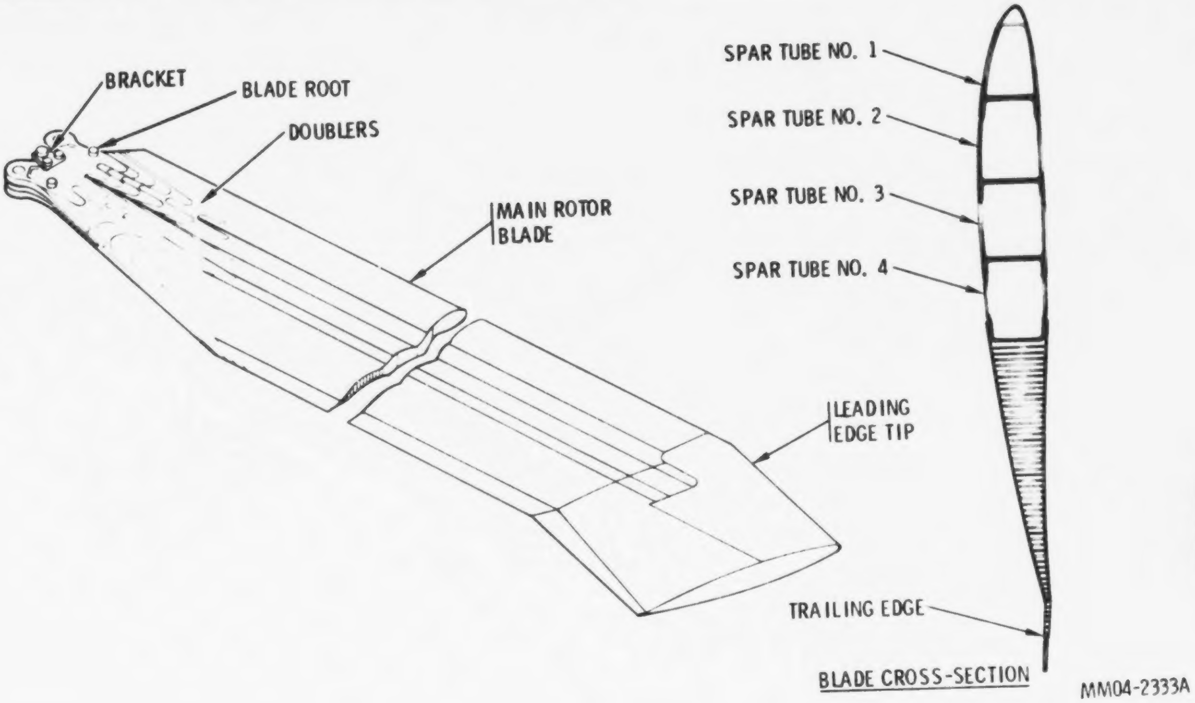
C. Four V-shaped stretched straps (strap packs) are bolted to the hub. Each strap pack has many stainless steel straps. The lead-lag links are attached to the strap packs.

D. The pitch housing uses a feathering bearing between the hub and housing. The bearing allows the housing to move up and down. An arm on each pitch housing is attached to the cyclic controls. Control inputs twist the pitch housing to cause rotor blade angle change.

E. Droop stop followers in the hub lower shoe contact the droop stop ring to limit the pitch housing downward movement when the rotor is stopped.

F. Two dampers are attached between each pitch housing and its lead-lag link. The link can move back-and-forth when forced by its rotor blade. The dampers soften this movement and hold blade spacing.

5-1-4. MAIN ROTOR BLADE DESCRIPTION AND OPERATION


BRACKET
BLADE ROOT
DOUBLERS
MAIN ROTOR BLADE
LEADING EDGE TIP
SPAR TUBE NO. 1
SPAR TUBE NO. 2
SPAR TUBE NO. 3
SPAR TUBE NO. 4
TRAILING EDGE
BLADE CROSS-SECTION
MM04-2333A

A. Four main rotor blades provide lift for the helicopter.

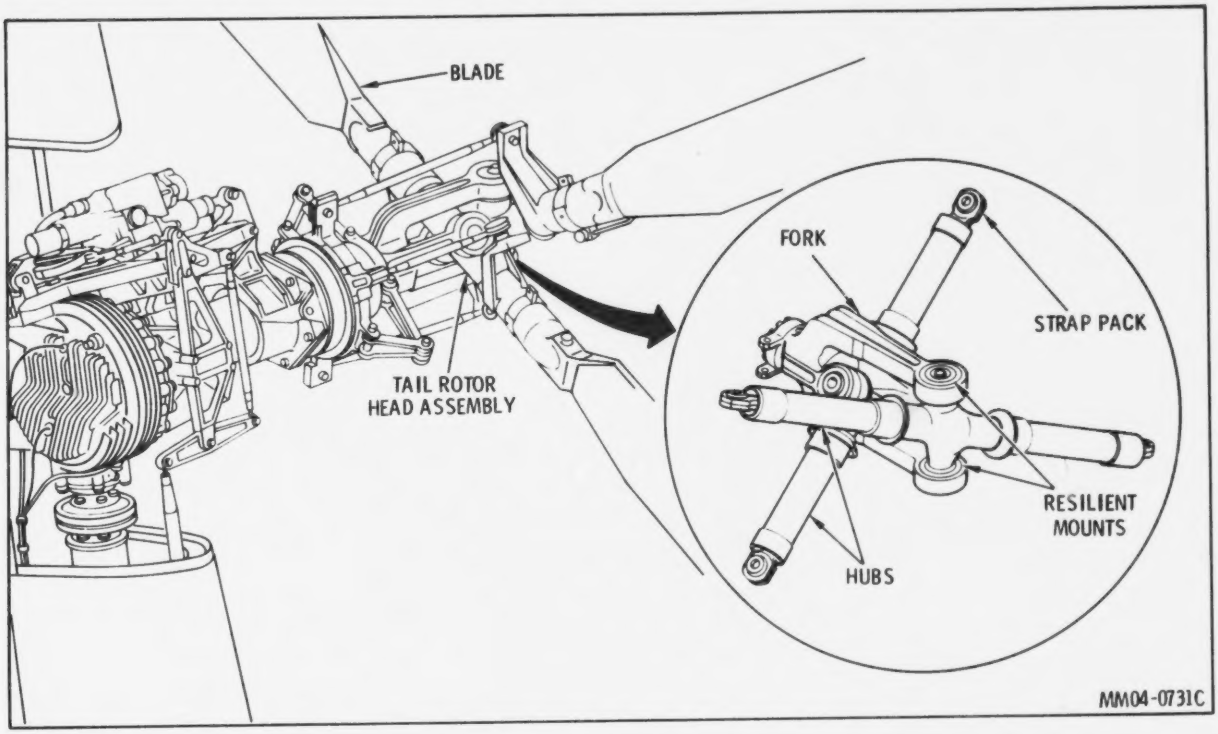
B. Each blade is attached to the main rotor hub by two expandable blade bolts.

C. Rotor blades can be removed from the helicopter for transportation and storage.

D. Trim tabs are mounted along the outer trailing edge of the blade. They are used to adjust the blade track through the air. DO NOT BEND THE TRAILING EDGE except for flight adjustment.

E. Balance weights are installed at each blade root. They are added or removed to balance the main rotor hub and blades.

5-1-5. TAIL ROTOR DESCRIPTION AND OPERATION 5-1-5


BLADE
FORK
STRAP PACK
TAIL ROTOR
HEAD ASSEMBLY
RESILIENT
MOUNTS
HUBS
MM04-0731C

A. The tail rotor provides directional control for the helicopter.

B. The rotor is controlled by the pilot and CPG directional control pedals. Refer to chapter 11 for flight control information.

C. Major parts of the tail rotor are the head assembly and four rotor blades.

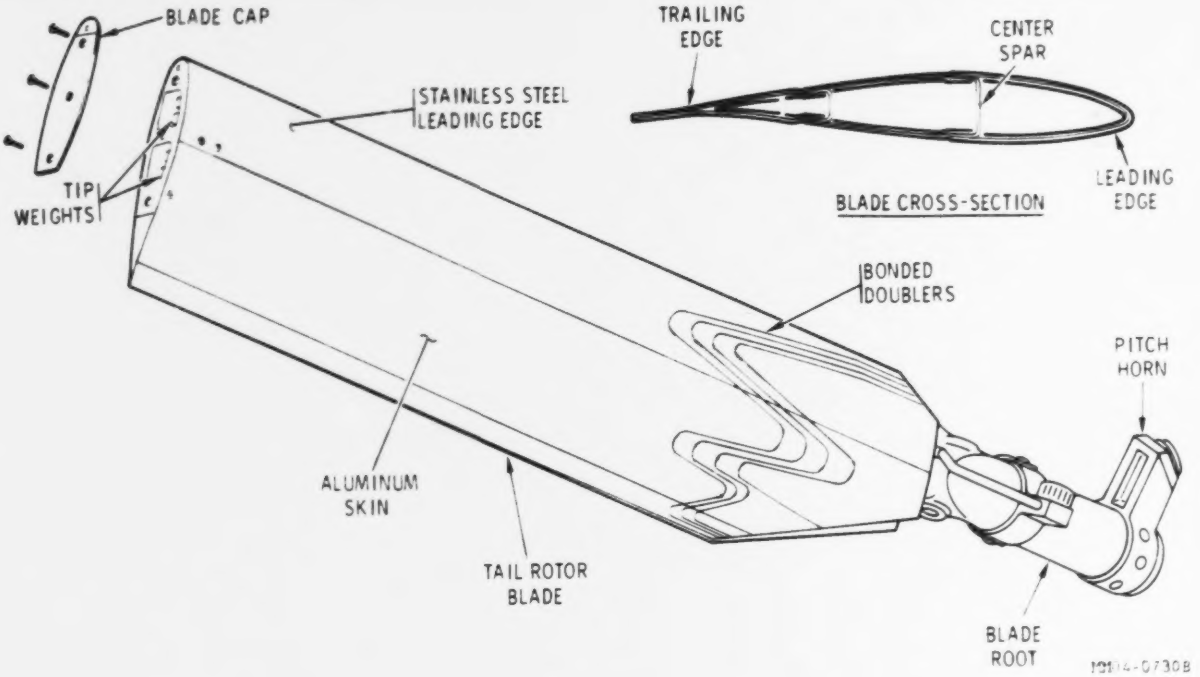
D. The head is mounted on the tail rotor gearbox drive shaft.

E. The head has one fork which supports the hub and two blades.

F. Resilient mounts allow each hub and blade to teeter (seesaw).

G. Each hub has a stainless steel strap pack that passes through the hub. The strap pack is attached to each opposite blade. The strap pack holds each blade and allows the blade to twist.

5-1-6. TAIL ROTOR BLADE DESCRIPTION AND OPERATION 5-1-6


BLADE CAP
TRAILING EDGE
CENTER SPAR
STAINLESS STEEL LEADING EDGE
TIP WEIGHTS
LEADING EDGE
BLADE CROSS-SECTION
BONDED DOUBLERS
PITCH HORN
ALUMINUM SKIN
TAIL ROTOR BLADE
BLADE ROOT
1914-0730B

A. Four tail rotor blades provide thrust for the tail rotor.

B. The rotor blades fit over the hubs in the tail rotor head. They rotate on bushings inside each blade root.

C. Blade pitch horns provide a connection for links to the tail rotor controls.

D. Tip weights are attached under a cap at the blade tip. These are used to balance each blade. Weights are added or removed to balance the tail rotor. DO NOT REMOVE THESE WEIGHTS UNLESS YOU ARE BALANCING THE ROTOR.

E. The blade skin is aluminum. It has bonded doublers at the blade root.

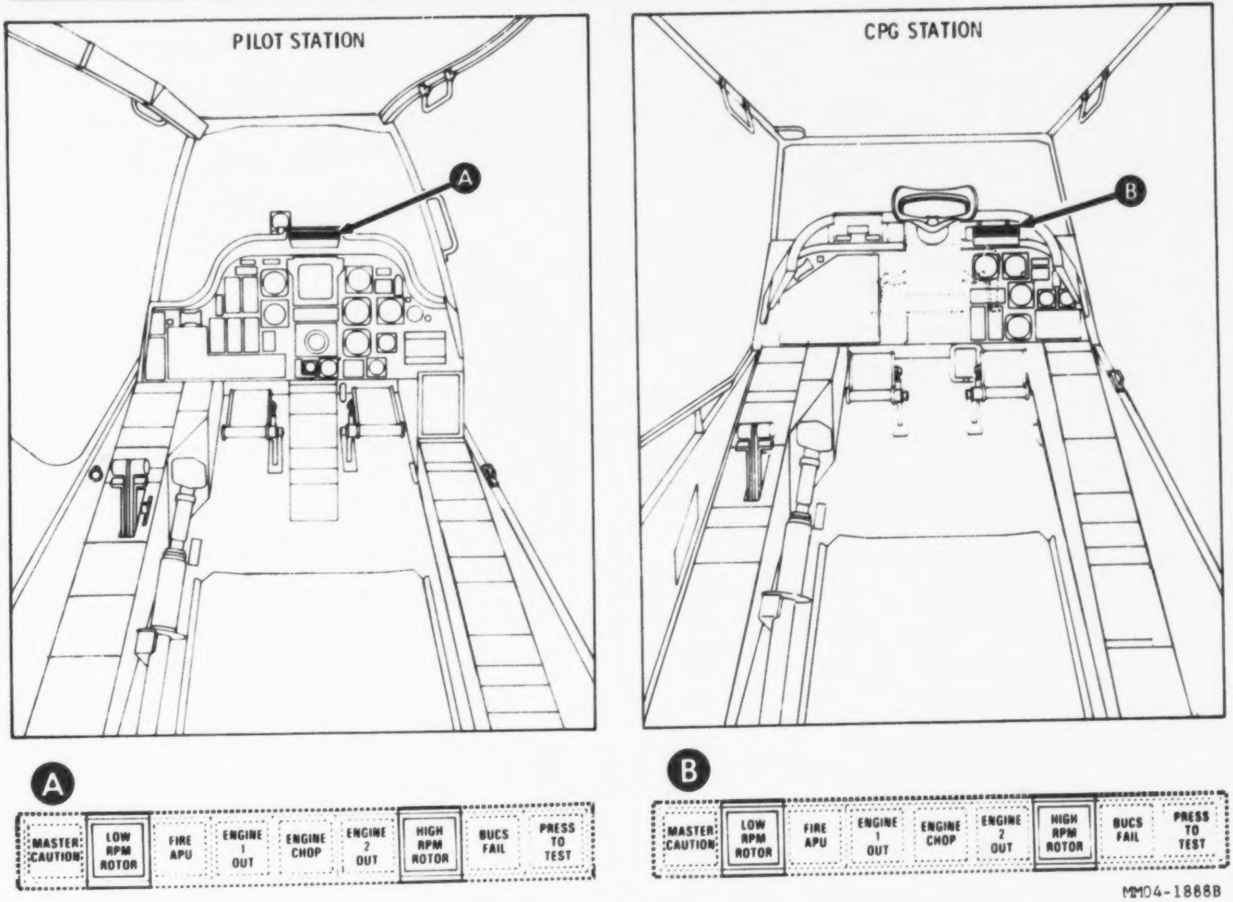
F. Each blade has three main spars. They are:

Leading edge - Stainless steel

Center - Aluminum

Trailing edge - Aluminum

5-1-7. ROTOR SYSTEM CONTROL AND INDICATOR DESCRIPTION AND OPERATION 5-1-7


PILOT STATION
CPG STATION
A
B
A
MASTER CAUTION
LOW RPM ROTOR
FIRE APU
ENGINE 1 OUT
ENGINE CHOP
ENGINE 2 OUT
HIGH RPM ROTOR
BUCS FAIL
PRESS TO TEST
B
MASTER CAUTION
LOW RPM ROTOR
FIRE APU
ENGINE 1 OUT
ENGINE CHOP
ENGINE 2 OUT
HIGH RPM ROTOR
BUCS FAIL
PRESS TO TEST

MM04-1888B

A. The rotor system is controlled by the collective and cyclic control sticks and the directional control pedals of the flight control system. Refer to chapter 11 for controls information.

B. Caution lights on the pilot and CPG instrument panels indicate faulty rotor rpm.

C. The LOW RPM ROTOR caution lights will light if rotor rpm drops below normal. The lights will remain on until return to normal operating rpm.

D. The HIGH RPM ROTOR caution lights will light if the rotor rpm is higher than normal. The lights will remain on until return to normal operating rpm.

Section II. MAIN ROTOR MAINTENANCE

5-2-1. MAIN ROTOR INSPECTION 5-2-1

Tools:

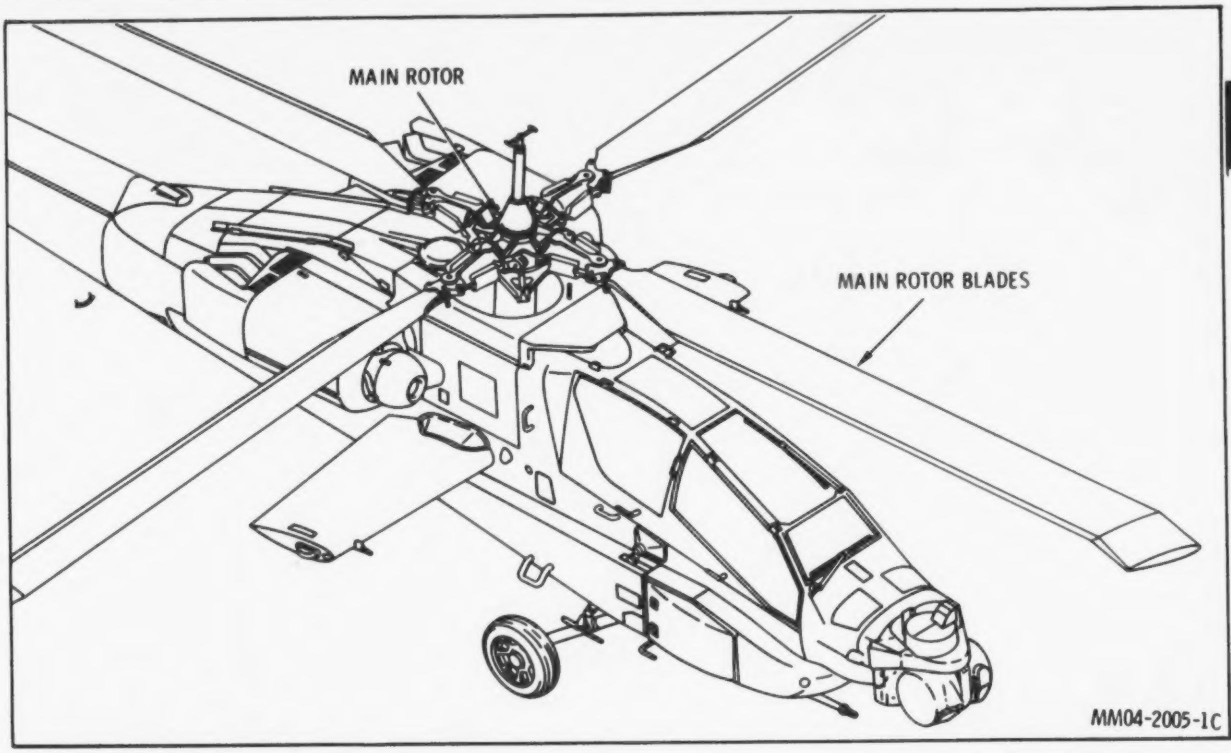
Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
2-2-2	Access fairings T205L, T205R, and doors T250L, T250R, T290L, T290R, and L325 opened



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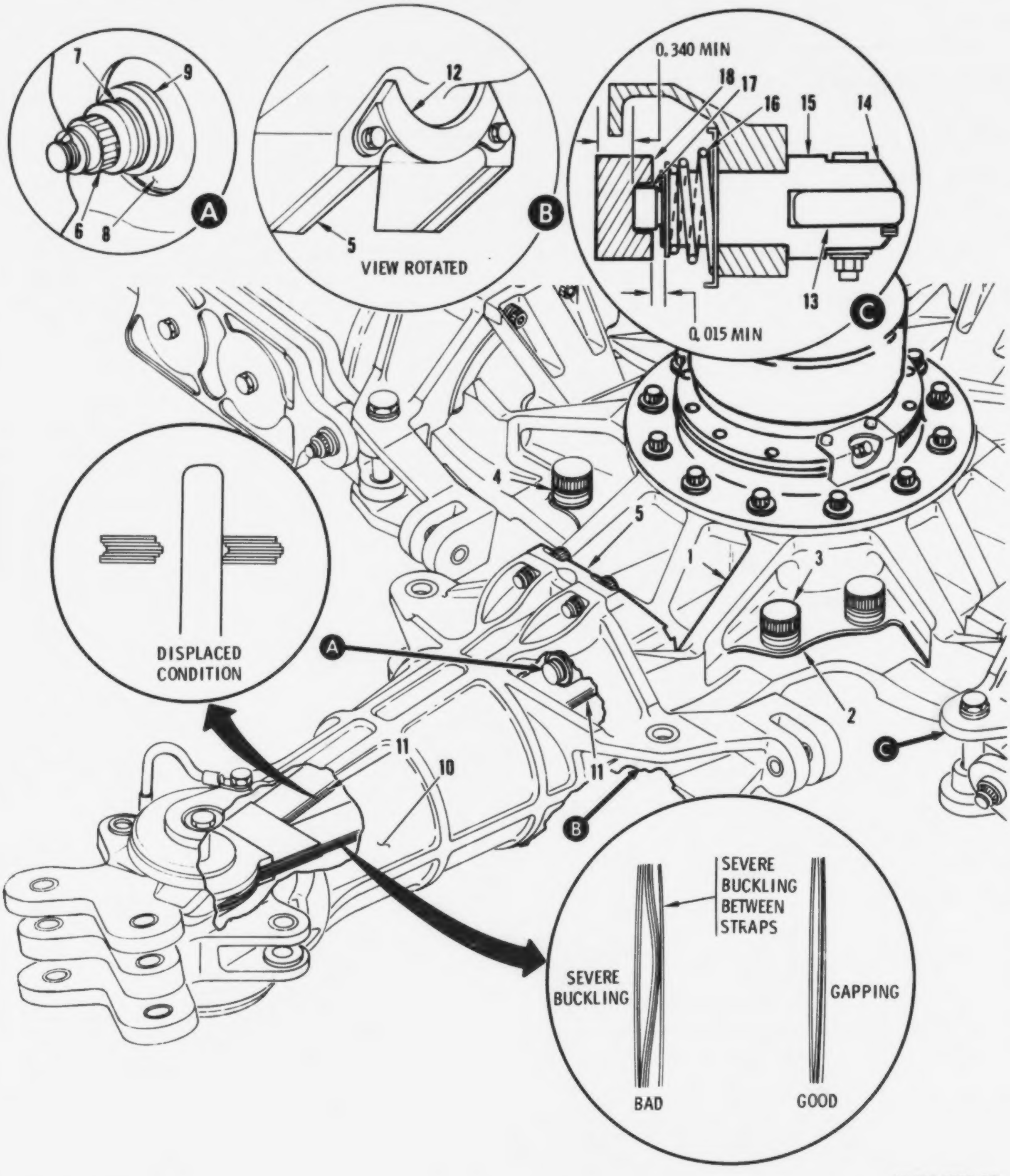
5-2-1. MAIN ROTOR INSPECTION (cont) 5-2-1


7
9
6
8
A
12
5
VIEW ROTATED
B
0.340 MIN
18
17
16
15
14
13
0.015 MIN
C
4
5
1
3
2
DISPLACED CONDITION
A
11
10
11
B
C
SEVERE BUCKLING BETWEEN STRAPS
SEVERE BUCKLING
GAPPING
BAD
GOOD

MM04-2005-2G

GO TO NEXT PAGE

NOTE

The main rotor includes the main rotor blades.

1. **Check main rotor for cracks, nicks, gouges, and scratches** (para 5-2-2).
2. **Check main rotor for loose or missing lockwire and cotter pins.** Replace if loose or missing.

CAUTION

If a preload indicating washer is loose, the washer must be removed and replaced with a new assembly.

NOTE

Corroded areas will be treated and restored in accordance with para 1-5-36.

3. **Check main rotor hub (1), shoe (2), and attaching bolts (3) for loose preload - indicating washer assemblies (4).**
4. **Check feathering bearing housing (5) retaining nut (6) for looseness.** None allowed.
5. **Check feathering bearing (8) for separation between bearing and housing (5) or bearing and center bushing (9).** None allowed.
   - Check feathering bearing for evidence of black powdery discharge. This is evidence of deterioration of elastomeric compound. Elastomeric compound surface cracks are allowed over entire area.
   - Debonding along a circular shim is allowable to a maximum arc of 180°, one place only.
   - Radial cracking through shim not allowed.
6. **Check pitch housing (11) for loose attachment to feathering bearing housing (6).** None allowed.
7. **Check inside of pitch housing (11) for foreign matter.**

NOTE

Insure that the collective control stick and the cyclic control stick are in the neutral position. Insure that the swashplate is level/centered with respect to the aircraft.

8. **Check accessible portions of strap pack (11) for cracked, buckled, broken or horizontally displaced laminations.** Use mirror, flashlight, and tongue depressor (E129). Any cracked, buckled, broken or horizontally displaced laminate is considered discrepant.
   a. If one laminate is discrepant, the strap pack is serviceable.
   b. If two laminations per strap pack are discrepant, the strap pack is unserviceable. However, a one time flight to an adequate main-tenance facility is authorized, flight not to exceed two hours.
   c. If three or more laminations per strap pack are discrepant, the strap pack is unserviceable, no flights authorized.

GO TO NEXT PAGE

5-2-1. MAIN ROTOR INSPECTION (cont)

9. **Check droop stop roller striker plate (12) for wear.** Droop stop striker plates may have wear or dents/gouges to 0.030 inch.

10. **Check roller (13) of follower (14) for freedom of movement and loose hardware.**

11. **Check rollers (13) for chipping and wear or play** (para 5-2-27). Maximum depth of flat spots or dents on rollers (13) not to exceed 0.10 inch.

12. **Check droop stop plunger (15) for cracks.** None allowed. Maximum wear through anodized surface not to exceed 0.50 inch by 0.50 inch, three places.

13. **Check plunger (15) for freedom of movement by moving rotor blade up and down.**

14. **Check droop stop follower assembly (14) for broken or damaged spring (16).** None allowed.

15. **Check droop stop follower (17) for wear.** Curved surface wear can be measured on assembly by measuring gap. Minimum allowable gap 0.015 inch. Top or bottom surface wear at corners not to exceed maximum depth of 0.050.

16. **Check droop stop ring (18) for cracks.** None allowed. Surface wear, galling, or scoring not to exceed 0.025 inch. Minimum ring wall thickness (dimension A) is 0.340.

17. **After completion of steps 9 thru 16, check droop angle** (para 5-2-30).

18. **Check ground brush holder (19) for looseness.** None allowed.

19. **Check ground brush (20) for uneven contact with static mast (21)** (para 5-2-17)

20. **Check lead-lag link bearings (22) in pitch housing (10) for looseness.** None allowed.

21. **Check main rotor damper/lead-lag link grounding jumper (23) for broken wires.** Replace.

22. **Check grounding jumper (23) for broken attaching lugs.** Replace.

23. **Check damper (24) for looseness.** None allowed.

24. **Check damper (24) for tears or delamination of elastomeric material.**

    If surface tears or delamination have spread out along inner or outer edges, or if upper or lower edges of elastomeric material have tears or delamination exceeding four inches, replace damper (24) (para 5-2-20).

25. **Check damper rod end bearing (25) for wear.** Radial play not to exceed 0.008 inch. Axial play not to exceed 0.005 inch.

26. **Check bearing ball for corrosion** (para 1-5-38).

27. **Check lead-lag link bearings (22) for wear** (para 5-2-21).

28. **Check rotor blade for loose attaching pins (27)** (para 5-2-4).

GO TO NEXT PAGE

5-2-1. MAIN ROTOR INSPECTION (cont)

CAUTION

Do not manually press suspect areas. This will cause blade to yield to pressure causing core shear. Crackling sound is evidence of core shear.

29. **Check rotor blades (26) for bonding separation.** Coin tap suspect area to detect debonding of skin from honeycomb. Tapping alternately between a suspect area and a bonded area wil produce a different sound. When a skin to honeycomb debonding or core shear is present, a dull sound (thud) will be evident. Repair debonding defect (para 5-2-2).

30. **Check rotor blades (26) for scratches, nicks, and gouges** (para 5-2-2).

31. **Check rotor blades (26) for dents and depressions** (para 5-2-2).

32. **Visually check rotor blade leading edge tip (28) for loose or missing screws.** None allowed.

33. **Check rotor blade leading edge (29) for paint erosion** (para 5-2-2).

34. **Check rotor blade trailing edge (30) for cracks and voids.**

    a. Check trailing edge of main rotor blade for cracks by wiping top and bottom of trailing edge with cheesecloth. Use cheesecloth (E31). Snagging of cheesecloth indicates a crack. No cracks allowed.

    b. Do not manually press suspect areas. This will cause blade to yield to pressure causing core shear. Crackling sound is evidence of core shear.

35. **Check static discharger (31) for loose attachment and fraying** (para 5-2-37).

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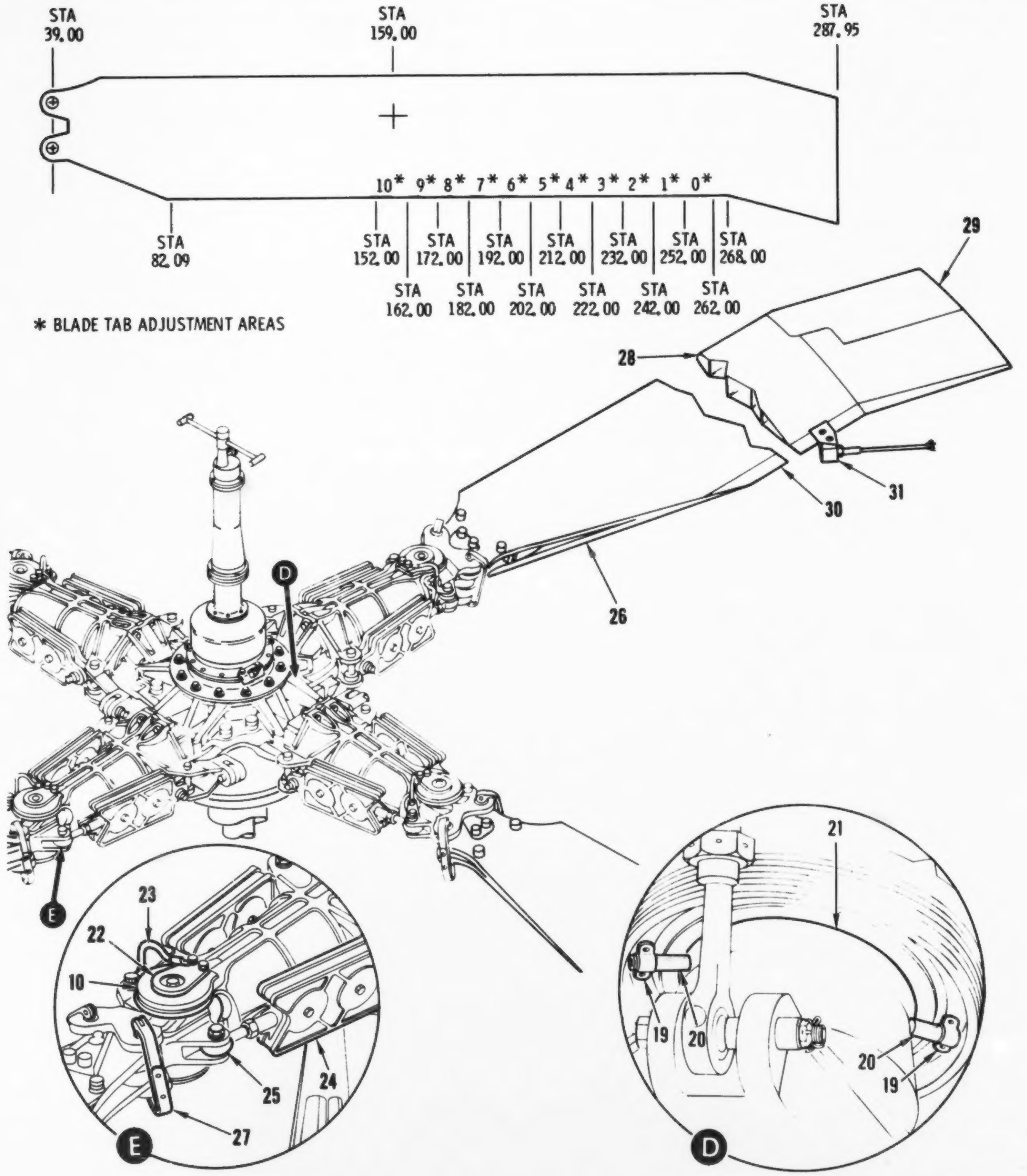
5-2-1. MAIN ROTOR INSPECTION (cont) 5-2-1


STA 39.00
STA 159.00
STA 287.95
10* 9* 8* 7* 6* 5* 4* 3* 2* 1* 0*
STA 82.09
STA 152.00
STA 172.00
STA 192.00
STA 212.00
STA 232.00
STA 252.00
STA 268.00
STA 162.00
STA 182.00
STA 202.00
STA 222.00
STA 242.00
STA 262.00
* BLADE TAB ADJUSTMENT AREAS
29
28
31
30
26
D
E
23
22
10
25
24
27
E
21
19
20
20
19
D

MM04-2005-3G

END OF TASK

5-2-2. MAIN ROTOR BLADE REPAIR CRITERIA

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed

Personnel Required:

67R10	Attack Helicopter Repairer
66R30	Inspector/Supervisor

1. **The main rotor blade repair criteria provide inspection and repair information for the rotor blades. The instructions for inspection are presented in tabular form.**

Table 5-1.	Provides repair limits for scratches, nicks, and gouges in the metallic skin area. This table shall also apply as limits for corrosion of the root fitting.
Table 5-2.	Provides repair limits for dents and depressions in the metallic skin area.
Table 5-3.	Provides repair limits for miscellaneous damage in the metallic skin area.
Table 5-4.	Provides repair limits for damage in the glass skinned honeycomb area.
Figure 5-1.	Provides repair limits for paint erosion.

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5-2-2. MAIN ROTOR BLADE REPAIR CRITERIA (cont) 5-2-2

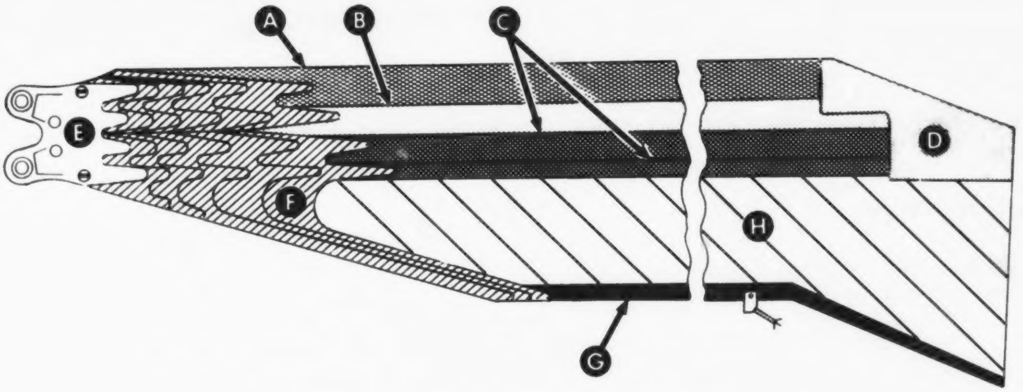

TABLE 5-1, SCRATCHES, NICKS, AND GOUGES.

AREA		MAXIMUM DEPTH WITHOUT REPAIR	MAXIMUM REPARABLE DEPTH [1]	REPAIR PARAGRAPH
Ⓐ ░	NO. 1 SPAR	.002	.010	5-2-8
Ⓑ □	NO. 2 SPAR	.002	.008	5-2-8
Ⓒ ▓	NO. 3 & 4 SPARS	.002	.005	5-2-8
Ⓓ □	TIP CAP	.002	.005	5-2-8
Ⓔ □	ROOT FITTING	NONE	.025	5-2-8
Ⓕ ▨	DOUBLERS	NONE	.003	5-2-8
Ⓖ ■	METALLIC TRAILING EDGE	NONE	.003	5-2-8
Ⓗ ▧	GLASS SKINS	SEE TABLE 4		

NOTES;

[1] DAMAGE EXCEEDING THESE LIMITS IS REPARABLE AT DEPOT ONLY.
2. ALL DIMENSIONS ARE IN INCHES.
3. LIMITS APPLY TO BOTH UPPER AND LOWER SURFACES.
4. INSPECTION WITH MAGNIFIER REQUIRED.
5. REPAIRS APPLY TO BOTH UPPER AND LOWER SURFACES.
6. THIS TABLE SHALL ALSO APPLY AS LIMITS FOR CORROSION OF THE ROOT FITTING.

MM04-2118-1F

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5-2-2. MAIN ROTOR BLADE REPAIR CRITERIA (cont)

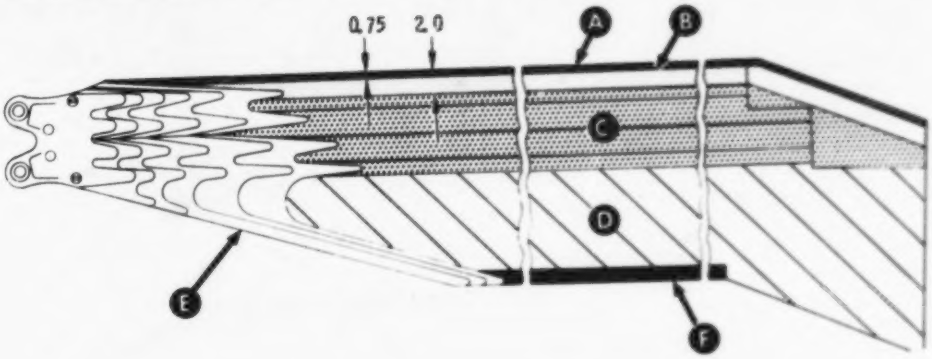

TABLE 5-2. DENTS, DEPRESSIONS, AND CREASES.

AREA		MAXIMUM DEPTH WITHOUT REPAIR	MAXIMUM REPARABLE DEPTH	MAXIMUM ALLOWED AREA	MAXIMUM NUMBER OF DEFECTS	MINIMUM DISTANCE BETWEEN DEFECT CENTERS	REPAIR PARAGRAPHS
A	■	UPPER SURFACE 0.008 LOWER SURFACE 0.009	0.015 [4]	0.50 x 0.50	3	10.0	5-2-6
B	□	UPPER SURFACE 0.010 LOWER SURFACE 0.017	0.025 [4]	1.25 x 1.25	3	10.0	5-2-6
C	▒	UPPER SURFACE 0.015 LOWER SURFACE 0.017	0.030 [4]	1.5 x 1.5	3	10.0	5-2-6
D	▨			SEE TABLE 5-4			
E	□	.020	.030	1.5 x 1.5	3	6.0	5-2-6
F	■	0.010 [3]	[3]	—	3	18.0	5-2-6

NOTES;

1. ALL DIMENSIONS ARE IN INCHES.
2. USE STRAIGHT EDGE AND DEPTH GAGE. NO VISIBLE DENT SHALL EXIST DURING STRAIGHT EDGE TEST. STRAIGHT EDGE SHALL ROCK SMOOTHLY WITHOUT JARRING OR CLICKING ON ALL CURVED SURFACES.

[3] INSPECT FOR VOIDED (GAPPED) BOND LINES.

[4] INSPECT FOR VOIDED (GAPPED) BOND LINES AND DE-ICING BLANKET ELECTRICAL CONTINUITY.

5. REPAIRS APPLY TO BOTH UPPER AND LOWER SURFACES.

MM04-2118-2H

5-2-2. MAIN ROTOR BLADE REPAIR CRITERIA (cont) 5-2-2

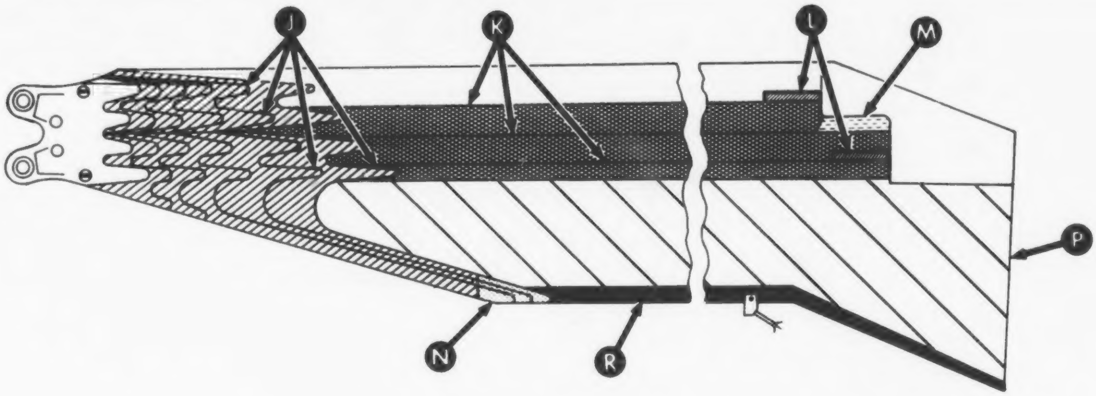

TABLE 5-3, MISCELLANEOUS DAMAGE

AREA			TYPE OF DAMAGE	MAXIMUM WITHOUT REPAIR	PARAGRAPH
Ⓙ	▨	DOUBLERS	DOUBLER DEBOND	NONE	5-2-7
Ⓚ	▩	SPARS	SPAR - TO - SPAR DEBOND	6.0 [1]	5-2-7
Ⓛ	☐	SPAR TIPS	NO. 1 & NO. 3 SPAR DEBOND	3.0	5-2-7
Ⓜ	☐	NO. 2 SPAR TIP	DEBOND	NONE	[2] 5-2-7
Ⓝ	☐	AFT DOUBLER TIP	DEBOND	NONE	5-2-7
Ⓟ	▧	GLASS SKIN AREA	SEE TABLE 5-4		
Ⓡ	■	METALLIC TRAILING EDGE	CRACKS	NONE	DEPOT ONLY
Ⓡ	■	METALLIC TRAILING EDGE	CREASES	3	5-2-6

NOTES:

[1] MAXIMUM 3 DEFECTS PER BLADE WITH A MINIMUM OF 18.0 INCHES BETWEEN DEFECTS.

[2] IF NO. 2 SPAR IS CRACKED, REPAIR IS AT DEPOT ONLY.

4. ALL DIMENSIONS ARE IN INCHES.
5. STATION 263 IS STATIC WICK LOCATION.
6. REPAIRS APPLY TO BOTH UPPER AND LOWER SURFACES.

MM04-2118-3K

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5-2-2. MAIN ROTOR BLADE REPAIR CRITERIA (cont)

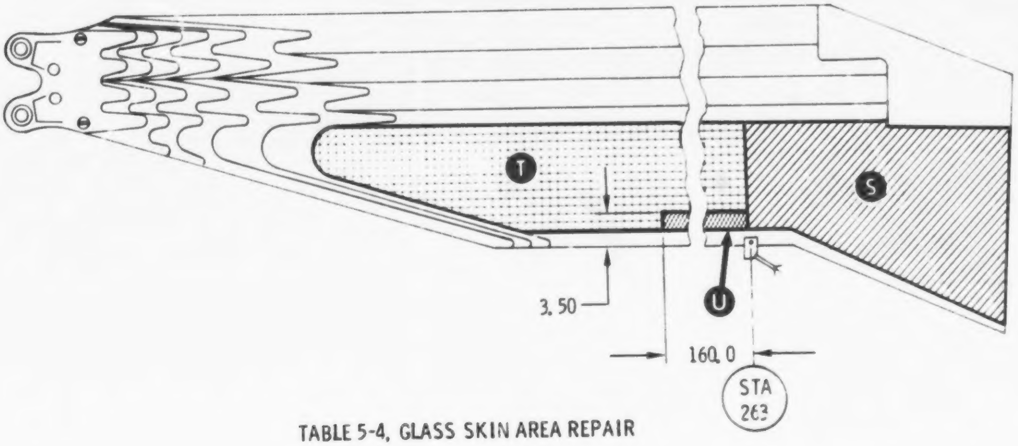

TABLE 5-4, GLASS SKIN AREA REPAIR

AREA	TYPE OF DAMAGE	ALLOWABLE LIMITS WITHOUT REPAIR	ALLOWABLE LIMITS WITH REPAIR [1]	REPAIR PARAGRAPH
Ⓢ ▨	CORE DISTRESS, DEBONDS AND DEPRESSIONS	3 SQ. IN.	12 SQ. IN.	5-2-5
Ⓢ ▨	HOLES THROUGH SKIN	NONE	0.25 DIA	[3] [4]
Ⓣ ░	CORE DISTRESS, DEBONDS AND DEPRESSIONS	7 SQ. IN.	25 SQ. IN.	5-2-5
Ⓣ ░	HOLES THROUGH SKIN	NONE	0.25 DIA	[3] [4]
Ⓤ ▒	CORE DISTRESS. DEBONDS AND DEPRESSIONS	160.0 INCHES SPANWISE [2]	160.0 INCHES SPANWISE [2]	5-2-5
Ⓤ ▒	HOLES THROUGH SKIN	NONE	0.25 DIA	[3] [4]

NOTES:

[1] DAMAGE EXCEEDING THESE LIMITS IS REPARABLE AT DEPOT ONLY.

[2] PROVIDED THAT CORE DAMAGE DOES NOT INTERFERE WITH TAB BENDING WHEN TRACKING BLADES.

[3] IF THERE IS REASON TO SUSPECT THAT WATER IS PRESENT IN THE PIERCED AREA, X-RAY MAY BE USED FOR DETERMINATION. IF WATER IS FOUND TO BE PRESENT, REMOVE PER PARAGRAPH 5-2-3.

[4] REFER TO TM 55-1500-204-25/1 FOR REPAIR INSTRUCTIONS.

5. ALL DIMENSIONS ARE IN INCHES.
6. REPAIRS APPLY TO BOTH UPPER AND LOWER SURFACES.

MM04-2118-5B

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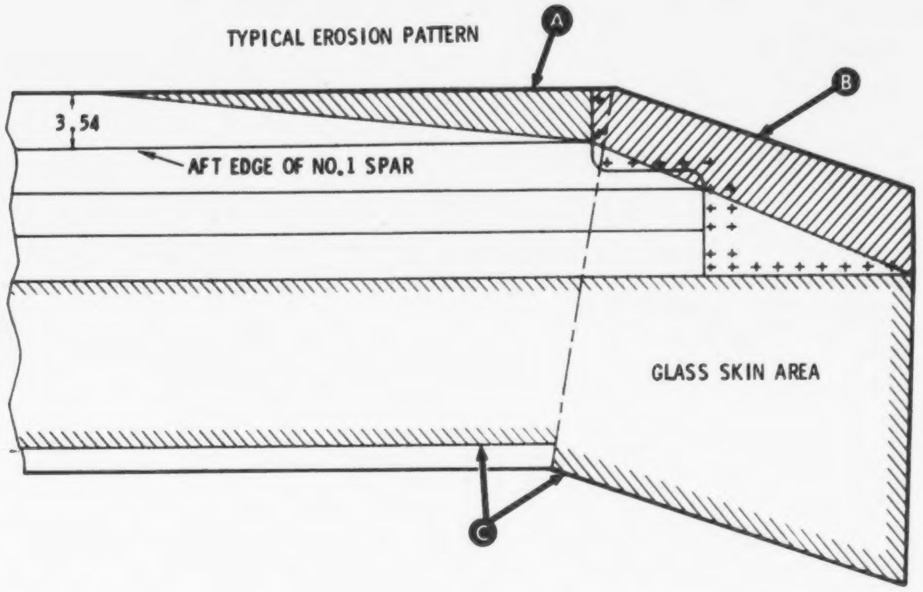
5-2-2. MAIN ROTOR BLADE REPAIR CRITERIA (cont) 5-2-2


TYPICAL EROSION PATTERN
Ⓐ
Ⓑ
3.54
AFT EDGE OF NO.1 SPAR
GLASS SKIN AREA
Ⓒ

Ⓐ ▧ AREA A IS SATISFACTORY WITHOUT REPAIR PROVIDED THAT BARE METAL IS NOT EXPOSED PAST THE AFT EDGE OF THE NO. 1 SPAR. FOR REPAIR SEE PARAGRAPH 5-2-8.

Ⓑ ▨ AREA B IS SATISFACTORY WITHOUT REPAIR WITHIN THE DEPICTED LIMITS UNLESS A PINK COLORED FILL-AND-FAIR MATERIAL IS EXPOSED, IN WHICH CASE IT SHOULD BE TOUCHED-UP. FOR REPAIR SEE PARAGRAPH 5-2-8.

Ⓒ ▢ AREA C (THE GLASS SKIN AREA) SHOULD NOT BE ALLOWED TO ERODE PAST THE POINT WHERE THE SKIN IS EXPOSED. FOR REPAIR SEE PARAGRAPH 5-2-8.

Figure 5-1. Typical Paint Erosion Pattern

END OF TASK

5-2-3. MAIN ROTOR BLADE ANTI-PEEL DOUBLER REPAIR (AVIM)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Airframe Repairer's	5180-00-323-4876
Bag, Shot	4935-01-148-6170
Respirator, Air Filtering	4240-00-022-2524
Apron, Impermeable	8415-00-082-6108
Goggles	4240-00-052-3776
Shears, Pinking	5110-00-162-2202
Gloves, Rubber	8415,00-266-8677

Materials/Parts:

(E4)	Tape, Pressure Sensitive
(E17)	Compound, Thread, Antiseize
(E21)	Abrasive Paper
(E31)	Cheesecloth
(E39)	Trichloroethane
(E56)	Tape, Pressure Sensitive
(E60)	Compound, Epoxy
(E68)	Brush (2)
(E75)	Abrasive Paper
(E118)	Cloth, Scrim
(E128)	Promoter, Epoxy Adhesive
(E129)	Adhesive
(E138)	Tape, Pressure Sensitive

Personnel Required:

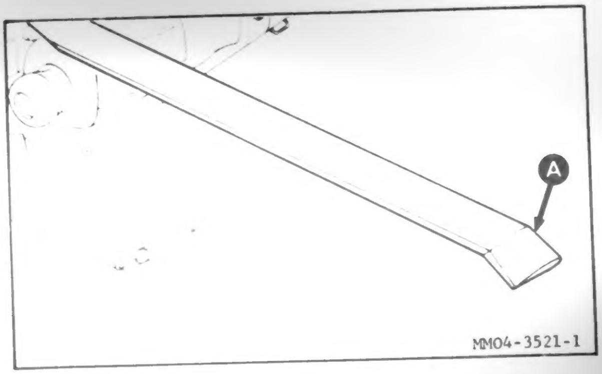
68G10	Aircraft Structural Repairer
66R30	Inspector/Supervisor

Reference:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
5-2-4	Main rotor blade removed
5-2-10	Main rotor blade leading edge removed



MM04-3521-1

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5-2-3. MAIN ROTOR BLADE ANTI-PEEL DOUBLER REPAIR (AVIM) (cont) 5-2-3

WARNING

The anti-peel doubler shall not be installed if any debonding outboard station 263 is detected. The No. 2 spar is a critical area. Failure to repair any debonded area may cause death or serious injury. If injury occurs, seek medical aid.

1. **Check main rotor blade outboard station 263 for any debonding.** None allowed (para 5-2-7).

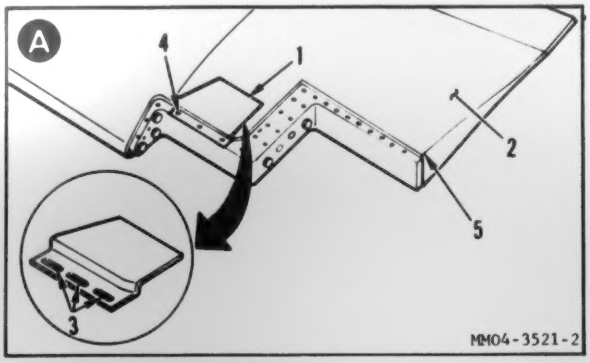
2. **Determine installation location of anti-peel doubler (1).**

   a. Place anti-peel doubler (1) on main rotor blade (2) alining the slots (3) with screw holes (4).

   b. Mask off the bonding area approximately 1/4 inch beyond the edges of anti-peel doubler (1). Use tape (E56).

   c. Mask off all screw holes (4). Use tape (E4).

   d. Mask off the faying surfaces (5) of the main rotor blade (2). Do not mask the area where the anti-peel doubler (1) is to be bonded. Use tape (E138).



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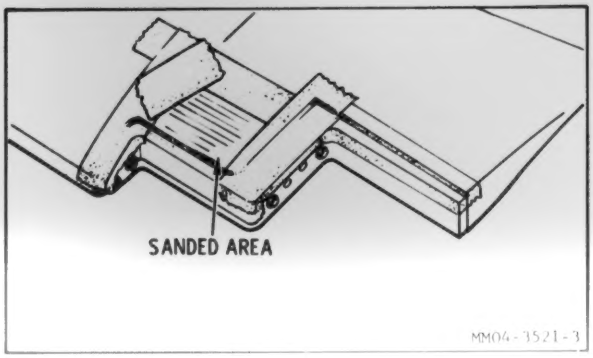

MM04-3521-3

CAUTION

To prevent damage to the main rotor blade, the fill and fair material between the spars is not to be removed when preparing the surface of the main rotor blade.

3. **Sand spandwise to remove paint primer, and fill material from the area to be bonded.** Use abrasive paper (E75).

4. **Sand spandwise to finish sanding the area to be bonded.** Use abrasive paper (E21).

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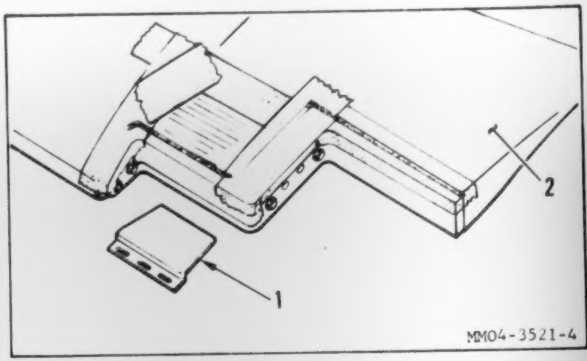
WARNING

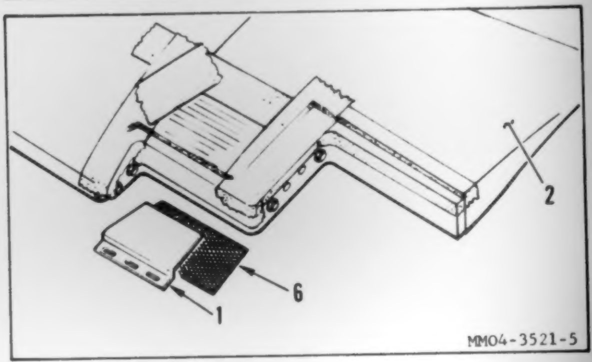
Trichloroethane is highly toxic. Use in well ventilated area. Breathing vapors could cause dizziness. If trichloroethane comes in contact with eyes or skin, flush with water. If injury occurs, seek medical aid.



5. **Clean the bonding surfaces of the anti-peel doubler (1) and the main rotor blade (2).** Use cheesecloth (E31) and trichloroethane (E39).

6. **Wipe the bonding surfaces of the anti-peel doubler (1) and main rotor blade (2) to remove residue.** Use cheesecloth (E31) and allow to air dry 10 minutes.

7. **Prime bonding surface of the main rotor blade (2).** Use promoter (E128) and brush (E68). Allow to air dry 1 hour.



8. **Cut one ply scrim cloth (6) (E118) the same size as the area to be bonded.** Use pinking shears.

9. **Impregnate scrim cloth (6) (E118) with adhesive.** Use adhesive (E129).

10. **Apply adhesive to binding surfaces of the anti-peel doubler (1) and main rotor blade (2).** Apply adhesive to portion of anti-peel doubler (1) which will be on top of main rotor blade and bonding surface of the main rotor blade (2). Use adhesive (E129) and brush (E68).

GO TO NEXT PAGE

5-2-3. MAIN ROTOR BLADE ANTI-PEEL DOUBLER REPAIR (AVIM) (cont) 5-2-3

11. **Install anti-peel doubler.** Use leading edge tip as clamp. Do not torque.

    a. Place scrim cloth (6) (E118) between the anti-peel doubler (1) and main rotor blade (2).

    b. Place leading edge tip (7) on main rotor blade (2).

    c. Apply antiseize compound (E17) to threads of three screws (8) which will extend through anti-peel doubler (1).

    d. Install screws (8) and tighten. Do not torque.

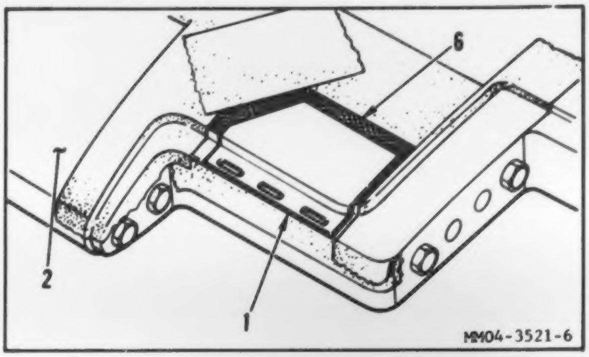
    e. Place tape (E56) over anti-peel doubler (1).

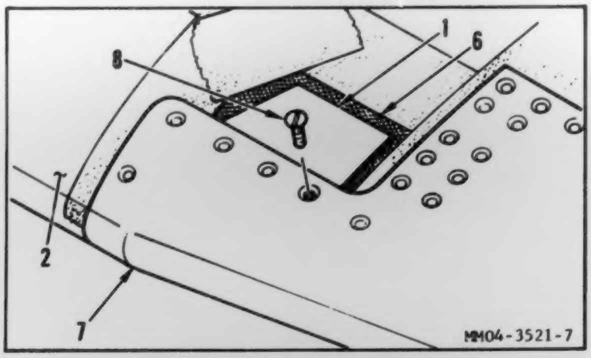
    f. Work air bubbles out from under the anti-peel doubler (1).

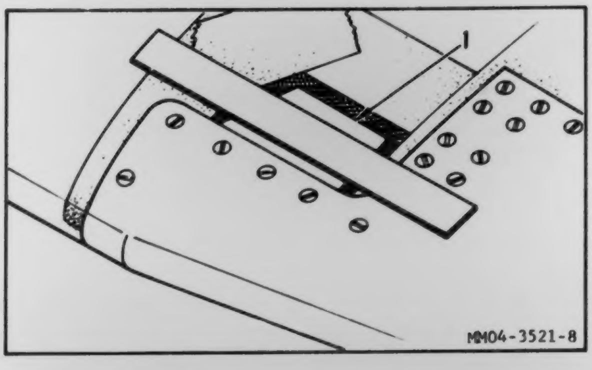
12. **Wipe excess adhesive (E129) from main rotor blade (2).**

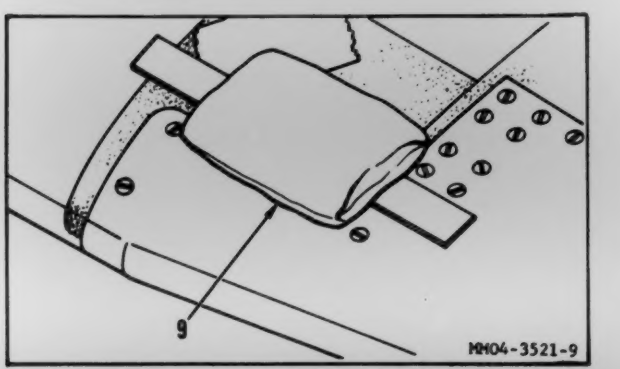
13. **Place shot bag (9) over surface of anti-peel doubler (1).**

14. **Allow adhesive (E129) to cure at room temperature for 24 hours.**









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5-2-3. MAIN ROTOR BLADE ANTI-PEEL DOUBLER REPAIR (AVIM) (cont)

15. **Remove tape from main rotor blade (2).**

    a. Remove screws (8). Clean threads of three screws that extended through anti-peel doubler (1).

    b. Remove leading edge tip (7) from main rotor blade (2).

    c. Remove tape from anti-peel doubler (1), main rotor blade (2), main rotor blade faying surfaces (5), and screw holes (4).

NOTE

Ensure that no tape remains in screw holes before installation of leading edge tip.

16. **Install leading edge tip (7)** (para 5-2-10).

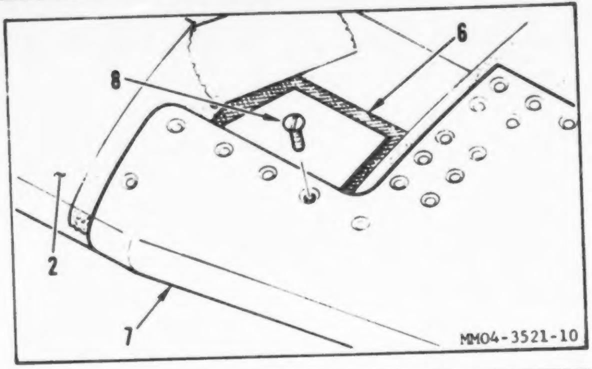
17. **Fill and fair edges of anti-peel doubler (1).** Use epoxy compound (E60).

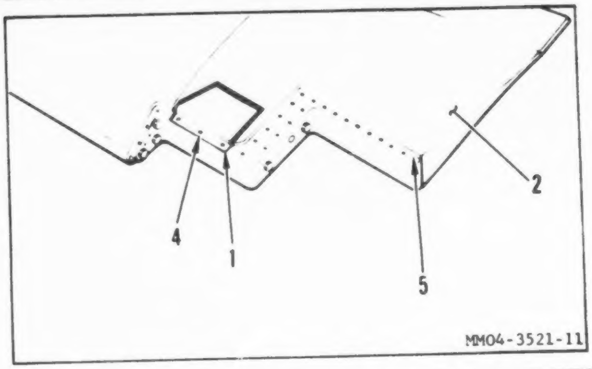
18. **Allow epoxy compound to dry at room temperature for 24 hours.**

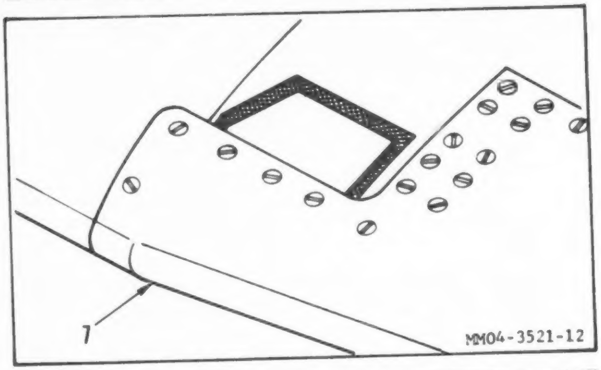
19. **Spot prime and paint rotor blade and surrounding area** (TM 55-1500-345-23).

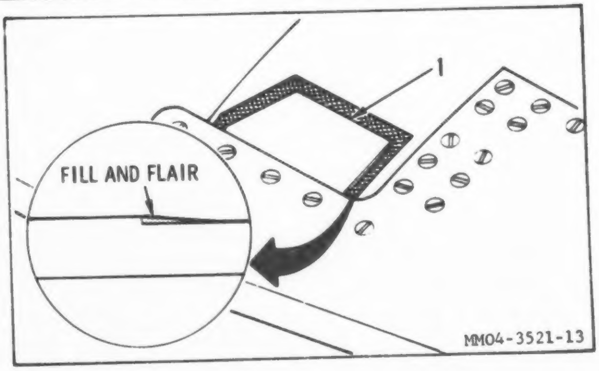
20. **Inspect (TI).**

21. **Perform main rotor blade track and balance** (TM 55-1520-238-T).









END OF TASK

5-2-4. MAIN ROTOR BLADE REMOVAL 5-2-4

This task covers: A. REMOVAL B. CLEANING C. INSPECTION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5120-00-323-4692
Adapter Kit, Airframe	1730-01-240-6743
Kit, Sling Set	1730-01-124-6781
Trailer, Maintenance	1730-00-435-7818

Personnel Required:

67R10 Attack Helicopter Repairer (3)
Two to assist

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
1-7-42	Maintenance crane installed
1-7-45	Crane adjustment-main rotor blade
1-7-51	Main rotor blade tiedown installed
1-7-55	Main rotor blade adapter installed
1-7-28	Droop stop wedges installed

CAUTION

Main rotor blades are individually calibrated to de-icing system controller. When removing main rotor blades, record blade serial number and power distributor connector number to ensure installation at same position. Incorrect de-ice system adjustment will cause damage to heater elements.

NOTE

If blade is to be replaced, remove balance weights from blade root and install on replacement blade.

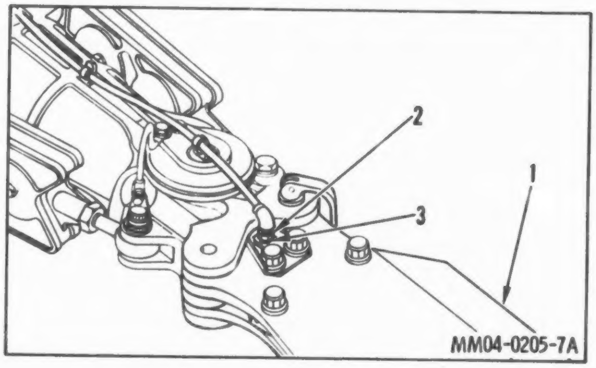
A. **REMOVAL**

1. **Position main rotor blade (1), to be removed, over forward fuselage.**

2. **Lock rotor brake** (para 1-7-7).

3. **Attach rotor blade tiedown at both ends of blade.**

4. **Remove lockwire.** Detach power distributor connector P1, P2, P3, or P4 (2) from heater element connector J1 (3) on blade (1). Record blade serial number and connector number if removing blade (1) for other maintenance.



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CAUTION

To prevent damage to main rotor blade, ensure rubber padding is secured to sling. Padding should be approximately 3/16 inch thick and undamaged.

5. **Install sling (6).**

   a. Rotate knurled knobs (7) clockwise to open jaws (8).

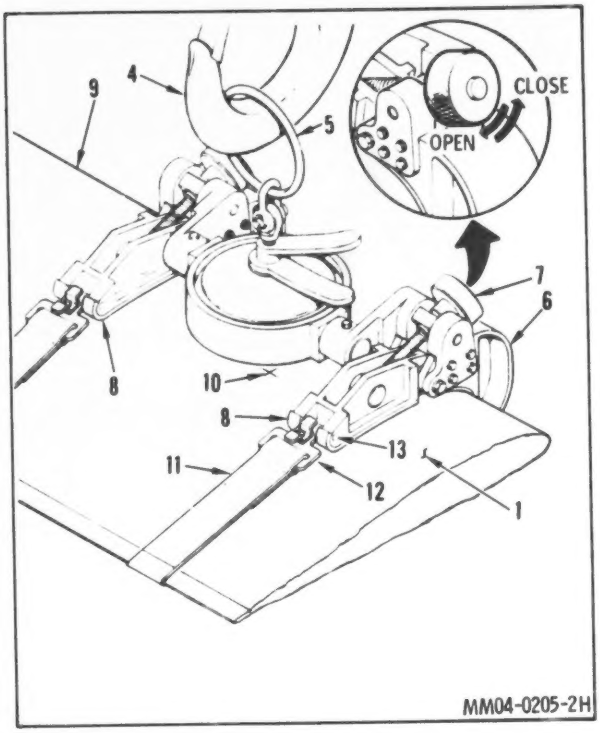
   b. Position sling (6) on leading edge (9) of blade (1). Use maintenance crane.

   c. Aline sling (6) with center-of-gravity (CG) indicator (10) on blade (1). Position CG indicator (10) approximately midway between jaws (8).

   d. Rotate knurled knobs (7) counterclockwise to close jaws (8) around blade (1).

   e. Position two straps (11) around blade trailing edge.

   f. Attach two spring clips (12) to two bolts (13).



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WARNING

If hoisted components are allowed to fall, personnel can suffer injury or death. Keep away from component mounting surfaces and loaded crane boom. If injury occurs, seek medical aid.

5. **Position crane hook (4) in lifting ring (5).** Install droop stop wedges (para 1-7-28).

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5-2-4. MAIN ROTOR BLADE REMOVAL (cont) 5-2-4

NOTE

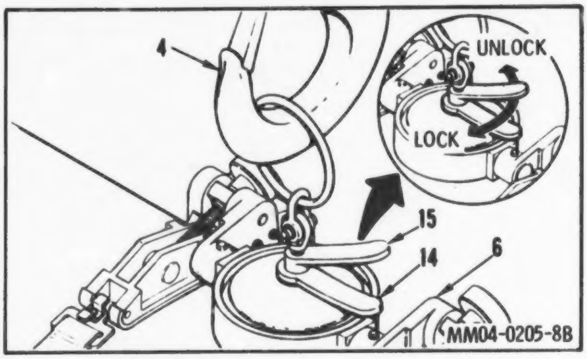
Locking spherical bearing on sling allows main rotor blade position adjustment ±15° in any direction to ensure proper removal/installation angle.

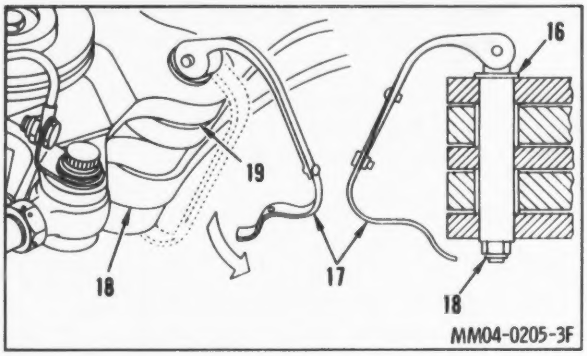
6. **Adjust position of sling (6) for blade removal.**

   a. Hold torque handle (14). Move clamp handle (15) counterclockwise to release bearing.

   b. Take up slack in sling (6) - **DO NOT LIFT BLADE.**

   c. Hold torque handle (14). Move clamp handle (15) clockwise to lock bearing.





7. **Unlatch and remove attaching pin (16).**

   a. Push down on spring clip (17) to remove from nut (18).

   b. Lift spring clip (17) to vertical.

WARNING

Keep fingers and hands away from the lead lag link. The main rotor blade could move after the pins are removed. A sudden blade movement could sever or crush your fingers or hands. If injury occurs, seek medical aid.

   c. Move two pins (16) up until free of blade root (18) and lead-lag link (19). Use crane to relieve grip pressure on blade (1).

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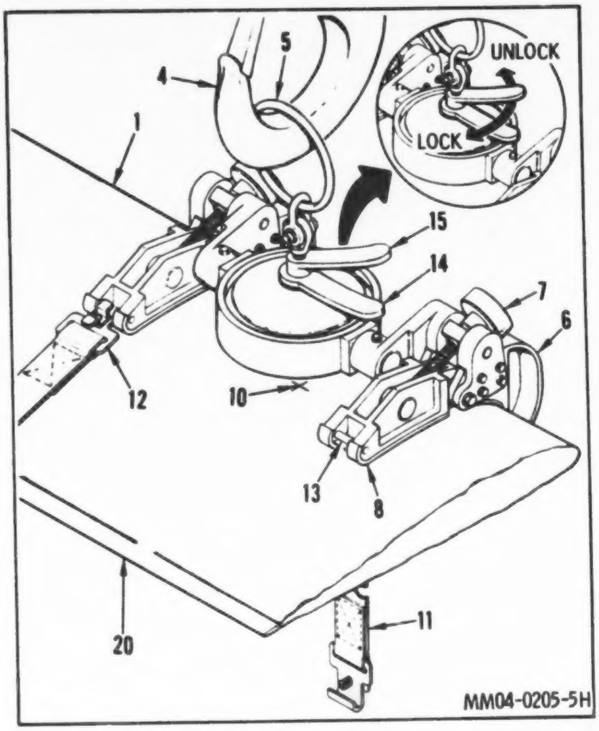
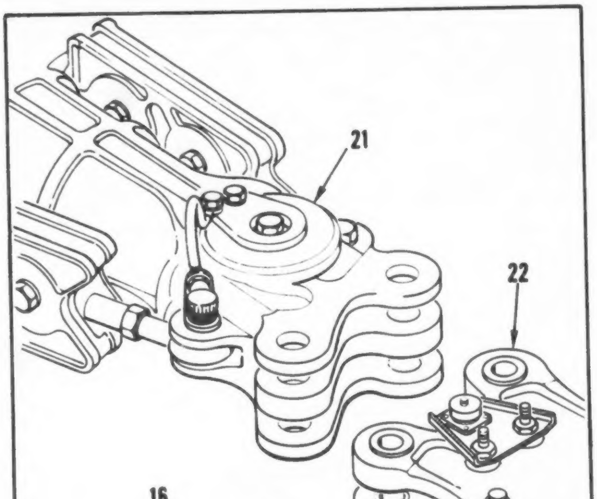
5-2-4. MAIN ROTOR BLADE REMOVAL (cont) 5-2-4





8. **Install main rotor blade (1) on handling adapter** (para 1-7-28).

WARNING

Release tension on maintenance crane cable before removing the blade sling. If tension is not released, serious injury could occur. If injury occurs, seek medical aid.

CAUTION

Do not damage main rotor blade trailing edge tabs during removal of main rotor blade sling.

9. **Remove sling (6).**

   a. Hold torque handle (14). Move clamp handle (15) counterclockwise to release bearing.

   b. Pull two spring clips (12). Detach two straps (11) from bolts (13).

   c. Rotate two knurled knobs (7) clockwise to open jaws (8).

   d. Use crane to remove sling (6) from blade (1).

   e. Remove hook (4) from ring (5).

B. CLEANING

Wipe lead-lag link blade root, and pin with a clean rag.

C. INSPECTION

1. **Check the entire main rotor blade especially trailing edge tab and where sling was installed for damage** (para 5-2-2).

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5-2-4. MAIN ROTOR BLADE REMOVAL (cont) 5-2-4

2. **Check lead-lag link** (para 5-2-21) **and blade root attaching holes for excessive wear, scratches, and hole elongation.** None allowed.

3. **Check pins for corrosion** (para 1-5-38). Maximum 0.010 on handle, maximum 0.001 elsewhere.

4. **Check lead-lag link and blade root** (para 5-2-2) **for corrosion** (para 5-2-22 and para 1-5-38).

5. **Check main rotor damper elastomer for tears or delamination** (para 5-2-1).

END OF TASK

5-2-5. MAIN ROTOR BLADE INSTALLATION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Kit, Sling Set	1730-01-124-6781
Gage, Dial Indicating	6635-00-578-5285
Tag Lines	

Materials/Parts:

(E34) Lockwire

Personnel Required:

67R10	Aircraft Helicopter Repairer (3) Two to assist
66R30	Inspector/Supervisor

References:

TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed
1-7-42	Maintenance crane installed
1-7-51	Main rotor blade tiedown installed

WARNING

If hoisted components are allowed to fall, personnel can suffer injury or death. Keep away from component mounting surfaces and loaded crane boom. If injury occurs, seek medical aid.

CAUTION

Main rotor blades are individually calibrated to de-icing system controller. The de-icing system controller shall be adjusted any time blades are not installed in same position as removed. Incorrect proper de-ice system adjustment will cause damage to heater elements.

NOTE

If blade being installed is a replacement blade, balance weights from removed blade must be installed on replacement blade.

GO TO NEXT PAGE

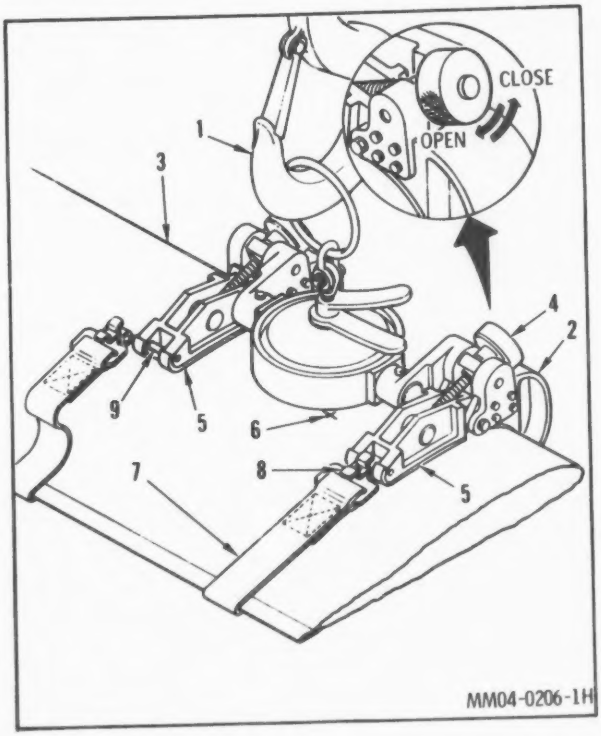
5-2-5. MAIN ROTOR BLADE INSTALLATION (cont)

1. **Attach crane hook (1) to sling (2).**

CAUTION

To prevent damage to main rotor blade, ensure rubber padding is secured to sling. Padding should be approximately 3/16 inch thick and undamaged. Use care when installing sling on base.

2. **Install sling (2) on main rotor blade (3).**
   - a. Rotate two knurled knobs (4) clockwise to open jaws (5).
   - b. Use crane to position sling (2) on leading edge of blade (3).
   - c. Aline sling (2) with center-of-gravity (CG) indicator (6) on blade (3). Position CG indicator (6) approximately midway between jaws (5).
   - d. Rotate two knurled knobs (4) counterclockwise to close jaws (5) around blade (3).
   - e. Position two straps (7) around blade trailing edge. Attach two spring clips (8) to two bolts (9).



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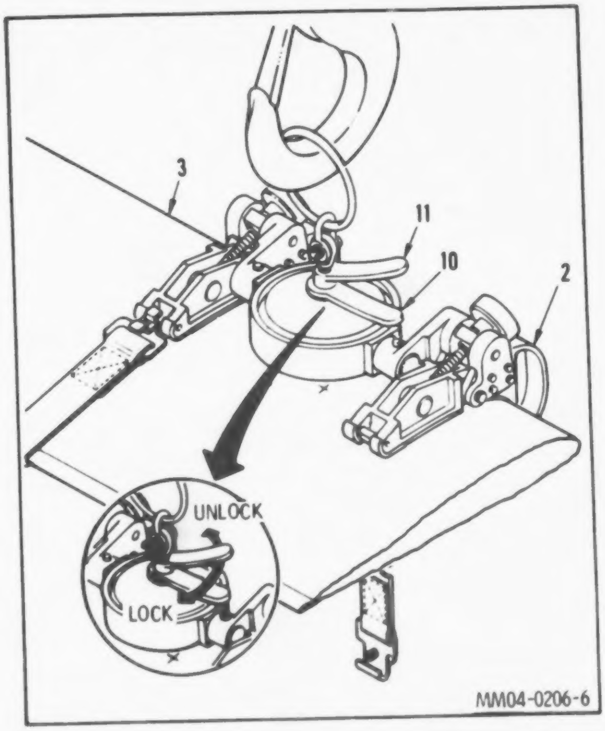
5-2-5. MAIN ROTOR BLADE INSTALLATION (cont)



NOTE

Locking spherical bearing on sling allows main rotor blade position adjustment ±15° in any direction to ensure proper removal/installation angle.

3. **Use sling (2) to position blade (3) at proper installation attitude.**

   a. Hold torque handle (10). Move clamp handle (11) counterclockwise to release bearing.

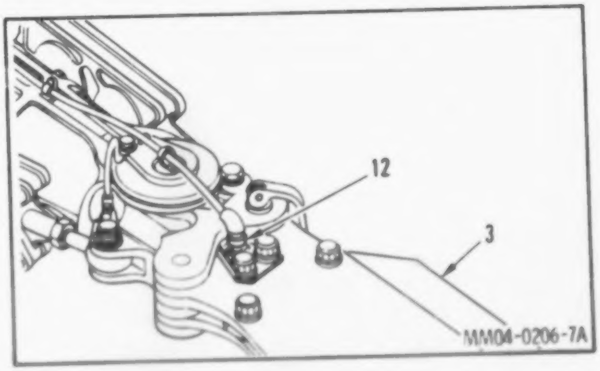
   b. Position blade (3) as required.

   c. Hold torque handle (10). Move clamp handle (11) clockwise to lock bearing.

4. **Install tag line to hub end of rotor blade (3).**

5. **Install main rotor blade (3).**

   a. If blade (3) was removed for other maintenance, note connector number (12) and blade serial number recorded during removal. Install in same position.



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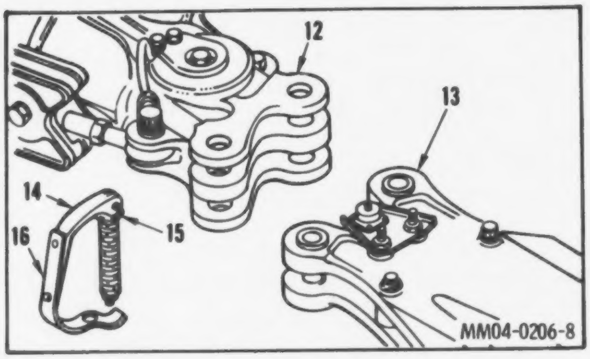
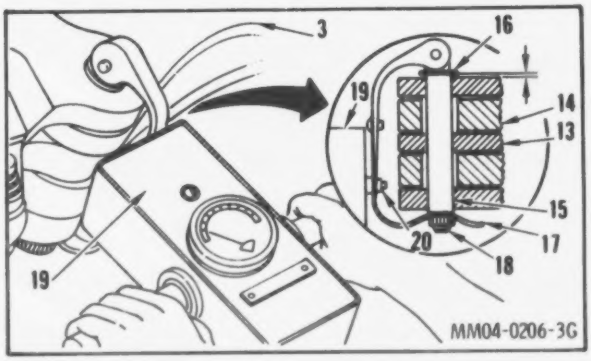
5-2-5. MAIN ROTOR BLADE INSTALLATION (cont) 5-2-5





b. Use tag lines to position and guide blade (3) into lead-lag link (13).

c. Aline holes in link (13) with holes in blade root (14).

d. Insert attaching pin (15) through link (13) and blade root (14).

e. Move pin (15) up or down to maintain a gap of **0.002 to 0.060-INCH** between link (13) and bottom of pin washer (16).

NOTE

Force required to close spring clip over nut is **50 to 60 POUNDS**.

6. **Latch spring clip (17) over nut (18) at bottom of pin (15).**

   a. Aline dial indicating gage (19) with clip (17) and lower rivet (20).

   b. Latch clip (17) over nut (18) and observe dial-indicating gage (19). Closing force should be **50 to 60 POUNDS** indicated.

   c. If **50 to 60 POUNDS** of closing force is not indicated at lower rivet (20), adjust nut (18) to required tension. Turn nut (18) clockwise to increase tension; counterclockwise to decrease.

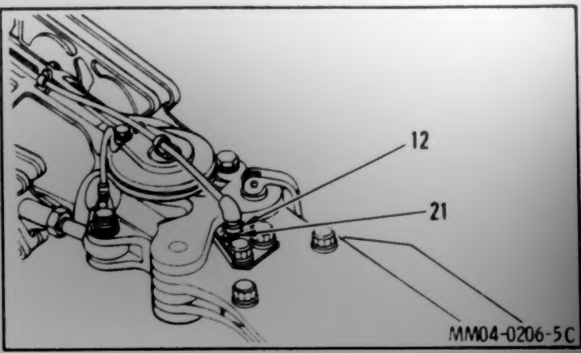
   d. Check for gap of **0.002 to 0.060-INCH** between link (13) and pin washer (16) after adjusting and closing clip (17).

GO TO NEXT PAGE

5-2-5. MAIN ROTOR BLADE INSTALLATION (cont)

7. Attach power distributor connector P1, P2, P3, and P4 (12) to blade heater element connector J1 (21). Lockwire connector. Use lockwire (E34).

8. Inspect (TI).



WARNING

Release tension on maintenance crane cable before removing the blade sling. If tension is not released, serious injury could occur. If injury occurs, seek medical aid.

CAUTION

Do not damage main rotor blade trailing edge tabs during removal of main rotor blade sling.

9. **Remove sling (2).**

   a. Hold torque handle (10). Move clamp handle (11) counterclockwise to release bearing.

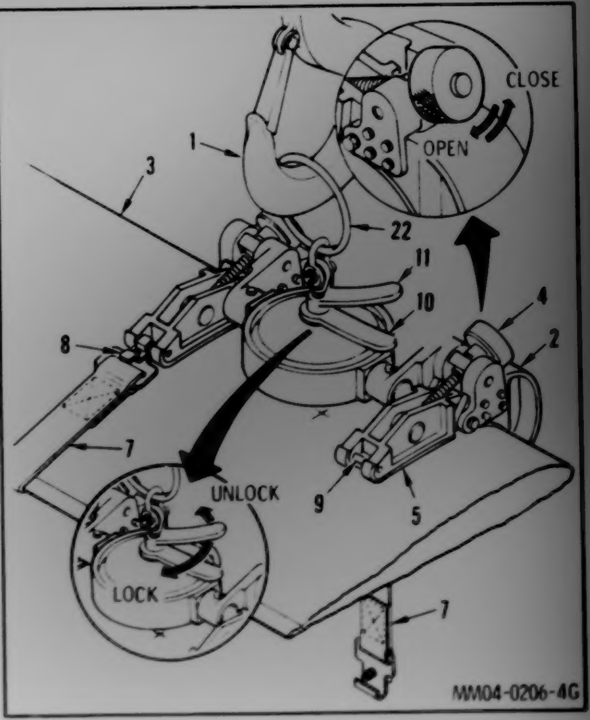
   b. Pull two spring clips (8). Detach two straps (7) from bolts (9).

   c. Rotate two knurled knobs (4) clockwise to open jaws (5).

   d. Use crane to lower sling (2) from blade (3) to ground.

   e. Remove crane hook (1) from lifting ring (22).

10. **Remove droop stop wedges.**



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5-2-5. MAIN ROTOR BLADE INSTALLATION (cont) 5-2-5

11. Check main rotor blade (para 5-2-1).

12. Remove main rotor blade tiedown (para 1-7-52).

13. Remove maintenance crane (para 1-7-50) from aircraft.

14. Inspect (TI).

15. Adjust de-ice system controller (para 12-2-14).

16. Perform main rotor track and balance operational checks (TM 55-1520-238-T).

END OF TASK

5-2-6. MAIN ROTOR BLADE DENT, DEPRESSION, AND CREASE REPAIR 5-2-6

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Airframe Repairer's	5180-00-323-4876
Gloves, Rubber	8415-00-266-8677
Apron, Impermeable	8415-00-082-6108
Goggles, Industrial	4240-00-052-3776
Gun, Spray	4940-00-261-8413
Cup, Gun, Spray	4940-00-190-5164
Respirator, Air Filtering	4240-00-022-2524
Knife, Putty	5120-00-221-1536

Materials/Parts:

(E20)	Abrasive Paper
(E21)	Abrasive Paper
(E39)	Trichloroethane
(E57)	Primer
(E60)	Compound, Epoxy
(E68)	Brush

Personnel Required:

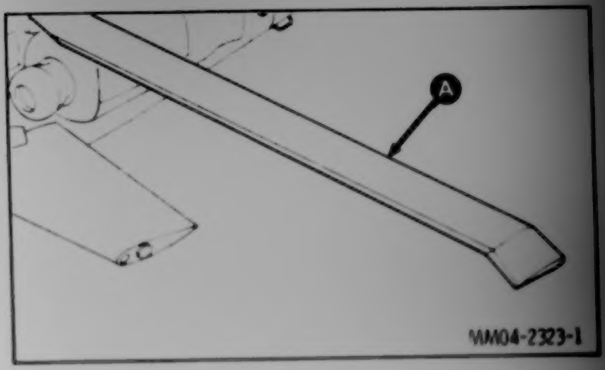
68G10	Aircraft Structural Repairer
66R30	Inspector/Supervisor

References:

TM 55-1500-345-23
TM 55-1520-238-T

Equipment Conditions:

Ref	Condition
1-7-2	Helicopter safed



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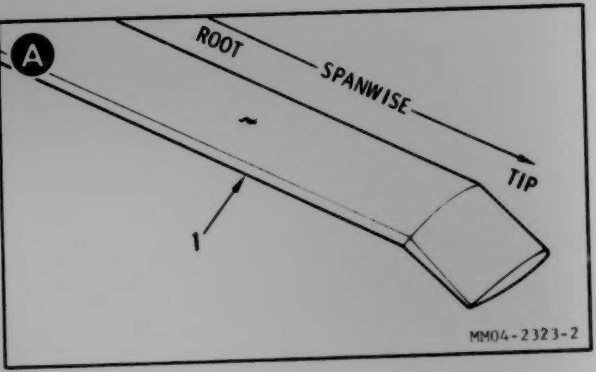
5-2-6. MAIN ROTOR BLADE DENT, DEPRESSION, AND CREASE REPAIR (cont) 5-2-6

CAUTION

Spanwise sanding applies to the metallic area only. The glass skinned area should be sanded chordwise.

1. Sand spanwise to remove paint from rotor blade (1) dents, depressions, creases, and surrounding area by sanding in a spanwise direction. Use abrasive paper (E20).
2. Sand spanwise to finish sand blade (1) surface. Use abrasive paper (E21).



WARNING

Trichloroethane is highly toxic. Use in well ventilated area. Breathing vapors could cause dizziness. If trichloroethane comes in contact with eyes or skin, flush with water. If trichloroethane comes in contact with eyes or dizziness occurs, seek medical aid.

3. Wipe rotor blade (1) surface clean. Use trichloroethane (E39). Wear goggles, gloves, and apron.

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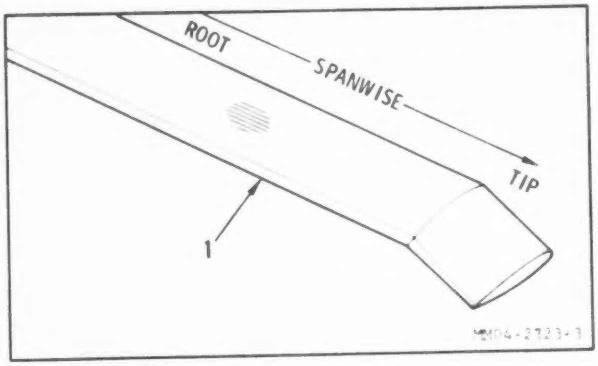
5-2-6. MAIN ROTOR BLADE DENT, DEPRESSION, AND CREASE REPAIR (cont) 5-2-6

WARNING

Epoxy compound is toxic. Use in well ventilated area. If compound comes in contact with eyes or skin, flush with water. If irritation occurs, seek medical aid.



4. **Brush an even coat of primer on rotor blade (1) dents, depressions, creases, and surrounding area.** Use brush (E68) and primer (E57). Allow primer (E57) to dry at room temperature 30 minutes. Discard brush in suitable container.

5. **Spread mixed compound over rotor blade (1) repair.** Blend compound to surrounding skin surface. Use putty knife and epoxy compound (E60). Allow compound to dry at room temperature for 24 hours.

6. **Sand dried compound on blade (1) in appropriate direction.** Use abrasive paper (E20).

7. **Finish sanding dried compound on blade (1) in appropriate direction.** Use abrasive paper (E21).

WARNING

Trichloroethane is highly toxic. Use in well ventilated area. Breathing vapors could cause dizziness. If trichloroethane comes in contact with eyes or skin, flush with water. If trichloroethane comes in contact with eyes or dizziness occurs, seek medical aid.

8. **Wipe blade (1) clean.** Use trichloroethane (E39). Wear goggles, gloves, and apron.

9. **Spot prime and paint blade (1) repair and surrounding area** (TM 55-1500-345-23).

10. **Inspect (TI).**

11. **Perform main rotor track and balance operational check** (TM 55-1520-238-T).

END OF TASK

5-2-7. MAIN ROTOR BLADE DEBONDED DOUBLER OR SPAR REPAIR (AVIM)

This task covers: A. DOUBLER REPAIR B. SPAR REPAIR

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Airframe Repairer's	5180-00-323-4876
Gun, Air Blower	4940-00-333-5541
Gun, Spray	4940-00-261-8413
Cup, Gun, Spray	4940-00-190-5164
Respirator, Air Filtering	4240-00-022-2524
Gloves, Rubber	8415-00-266-8677
Apron, Impermeable	8415-00-082-6108
Goggles	4240-00-052-3776
Brush, Wire	7920-00-291-5815
Syringe	6515-00-514-2395
Gun, Sealant	5120-00-165-4013
Shears, Pinking	5110-00-162-2202
Marker, China	7510-00-264-4612

Materials/Parts:

(E20)	Abrasive Paper
(E21)	Abrasive Paper
(E31)	Cheesecloth
(E39)	Trichloroethane
(E57)	Primer
(E60)	Compound, Epoxy
(E66)	Cloth
(E67)	Adhesive
(E68)	Brush (2)

Personnel Required:

68G10	Aircraft Structural Repairer
66R30	Inspector/Supervisor

References:

TM 55-1500-345-23

CAUTION

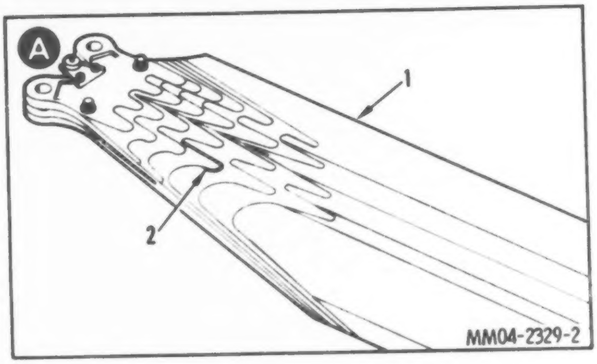
Spanwise sanding applies to the metallic area only. The glass skinned area should be sanded chordwise.

GO TO NEXT PAGE

5-2-7. MAIN ROTOR BLADE DEBONDED DOUBLER OR SPAR REPAIR (AVIM) (cont) 5-2-7

A. DOUBLER REPAIR

1. Check main rotor blade (1) for cracks (para 5-2-1).
2. Tap edge of a coin held between thumb and forefinger on main rotor blade (1) and doubler (2). A bonded spot will have a sharp ring. An unbonded spot will have a dull sound.
3. Mark area of doubler (2) to be repaired.
4. Sand spanwise to remove paint from debonded doubler (2) and surrounding area by sanding in a spanwise direction. Use abrasive paper (E20).
5. Sand spanwise to finish sand doubler (2) surface. Use abrasive paper (E21).
6. Lift debonded doubler (2) just high enough to remove existing loose cured adhesive. Scuff sand surface of remaining adhesive. Use abrasive paper (E20) and (E21).
7. Remove loose scale, chips, and dust between mating surface of blade (1) and debonded doubler (2).



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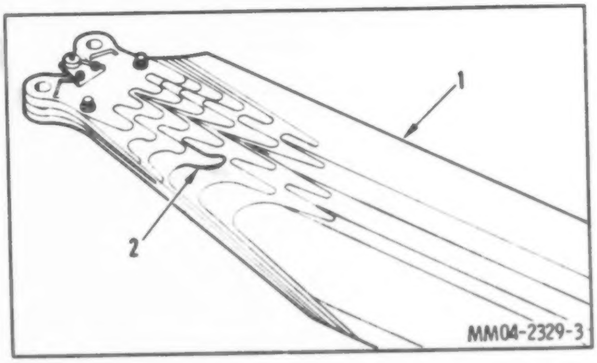

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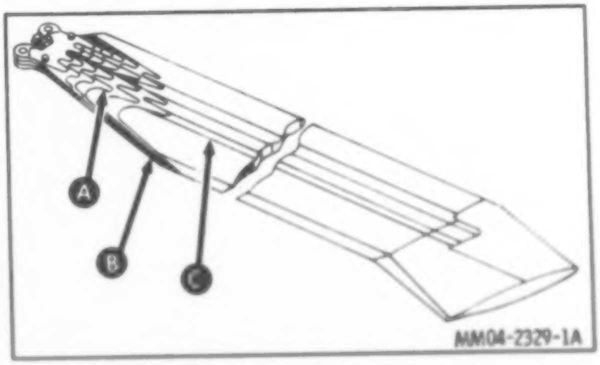

MM04-2329-1A

WARNING

Trichloroethane is highly toxic. Use in well ventilated area. Breathing vapors could cause dizziness. If trichloroethane comes in contact with eyes or skin, flush with water. If trichloroethane comes in contact with eyes or dizziness occurs, seek medical aid.

8. Brush and wipe between mating surface of blade (1) and debonded doubler (2). Use brush (E68) and trichloroethane (E39); wipe dry. Use cheesecloth (E31). Wear goggles, gloves, and apron. Discard brush in suitable container.
9. Prime cleaned area. Use primer (E57) (TM 55-1520-345-23).

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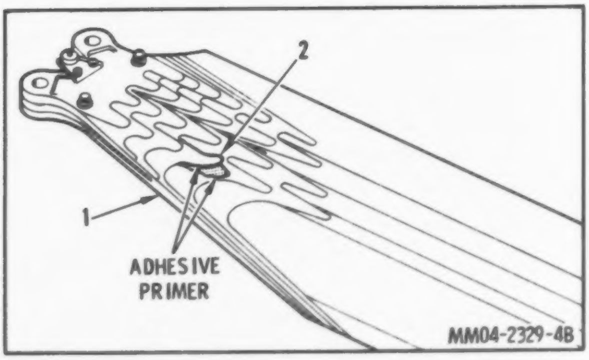
5-2-7. MAIN ROTOR BLADE DEBONDED DOUBLER OR SPAR REPAIR (AVIM) (cont) 5-2-7

WARNING

Adhesive is toxic. Use in well ventilated area. If adhesive comes in contact with eyes or skin, flush with water. If irritation occurs, seek medical aid.

10. Brush an even coat of adhesive between blade (1) and debonded doubler (2). Use brush (E68) and adhesive (E67). Allow adhesive to dry at room temperature 30 minutes.



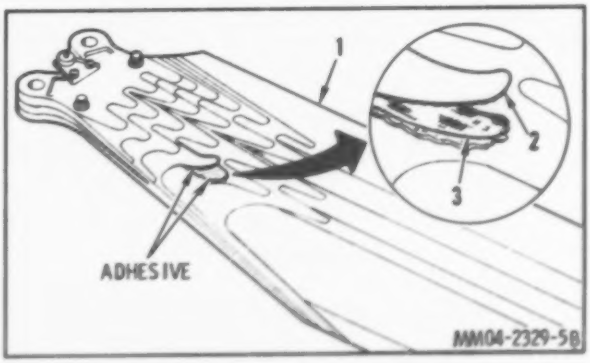
MM04-2329-4B

11. Cut a piece of cloth (3) to size and shape of debonded doubler (2). Use cloth (E66).

12. Impregnate cloth (3) with adhesive. Use adhesive (E67).

13. Place impregnated cloth (3) between rotor blade (1) and debonded doubler (2).

14. Press debonded doubler (2) against rotor blade (1). Apply only necessary pressure to hold doubler (2) against rotor blade (1). Hold with tape if necessary.



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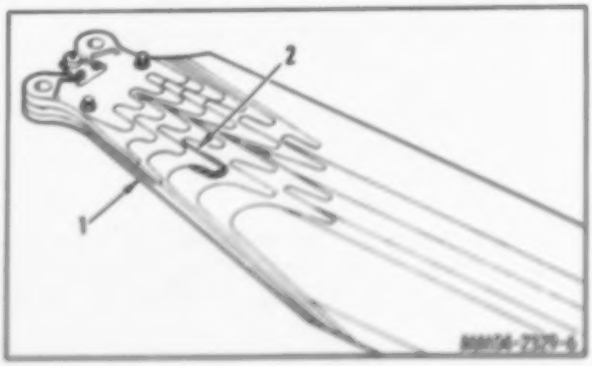
15. Wipe excess adhesive from rotor blade (1).

16. Allow adhesive to cure at room temperature for 24 hours.



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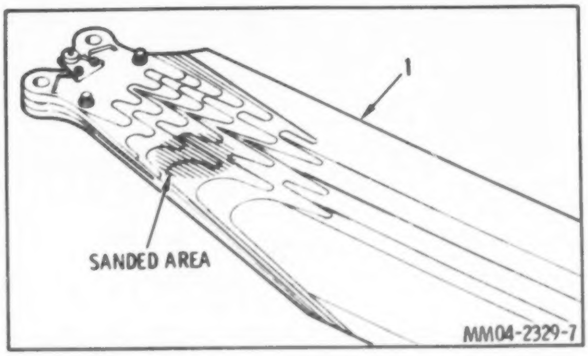
5-2-7. MAIN ROTOR BLADE DEBONDED DOUBLER OR SPAR REPAIR (AVIM) (cont) 5-2-7

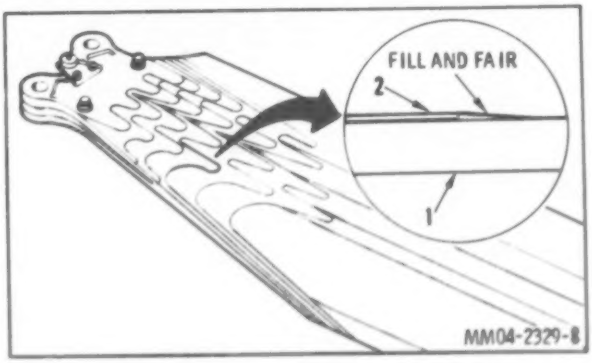
17. Sand cured adhesive (E67) on rotor blade (1) in a spanwise direction. Use abrasive paper (E20).

18. Sand spanwise to finish sand adhesive (E67) on rotor blade (1) in a spanwise direction. Use abrasive paper (E21).



WARNING

Trichloroethane is highly toxic. Use in well ventilated area. Breathing vapors could cause dizziness. If trichloroethane comes in contact with eyes or skin, flush with water. If trichloroethane comes in contact with eyes or dizziness occurs, seek medical aid.



19. Wipe rotor blade (1) clean. Use trichloroethane (E39) and cheesecloth (E31). Wear goggles, gloves, and apron.

20. Check repaired debonded doubler (2). Tap edge of a coin held between thumb and forefinger on doubler (2). A bonded spot will have a sharp ring. An unbonded spot will have a dull sound.

21. Fill and fair cavity between rotor blade (1) and repaired doubler (2). Use compound (E60).

22. Allow compound (E60) to dry at room temperature for 24 hours.

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